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# MINNESOTA MEDICINE

*Journal of the Minnesota State Medical Association, Southern Minnesota Medical Association, Northern Minnesota Medical Association, Minnesota Academy of Medicine and Minneapolis Surgical Society*

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# MINNESOTA MEDICINE

*Journal of the Minnesota State Medical Association, Southern Minnesota Medical Association, Northern Minnesota Medical Association, Minnesota Academy of Medicine and Minneapolis Surgical Society.*

Volume 20

December, 1937

Number 12

## PHYSIOLOGIC MECHANISMS IN RELATION TO THE DEVELOPMENT OF PEPTIC ULCER\*

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IN many pathologic conditions anatomic and physiologic characteristics determine the site, process of development, character and extent of the lesion. This statement appears to be especially pertinent in regard to the experimentally produced lesion, peptic ulcer. In this brief review of the results of experimental investigations on peptic ulcer I wish to present the more significant facts concerning the anatomic and physiologic basis for the characteristic development of the experimentally produced ulcer together with a description of the processes of formation and healing of the lesion.

Some of the factors which have been proven of significance in the experimentally produced lesion could also be present in the spontaneously occurring peptic ulcer of man, but owing to the fact that other circumstances differ, exact comparisons between the two conditions will be justified only when knowledge of both has been considerably enhanced. No attempt will be made to correlate the facts that have been learned about peptic ulcer from experimental studies with those that are known from clinical studies of the condition in man, as I believe that attempts to apply the experimental data to the clinical condition should be made by the clinician possessing a thorough knowledge of the life history of the lesion in the human.

### Physiologic Mechanisms of the Digestive Tract

In order to evaluate the anatomic and physiologic factors that are significant in the development of the experimentally produced ulcer, the

gastro-intestinal tract should be considered a complete organ. The digestive mechanism phylogenically has been efficiently adapted to the biologic environment of the species. The single-celled organism engulfs its food and digests it within itself with its own intercellular enzymes. From this simple digestive mechanism of the single-celled organism, there are many gradations until the higher organism, man, is reached, in which case the digestive process occurs in a tube composed of several highly specialized portions contained in the body cavity. The changes in the digestive mechanism are adapted to such biologic environmental factors as the character of the food, the method of procuring food, and especially to the need for permitting the organism to do other things than take care of the food supply to the body. To this end the gastro-intestinal tract of man has been developed to function, as Meek has expressed it so well, "to receive, to store, to propel and to expel ingesta and during transit so to manipulate them mechanically and to alter them chemically that digestion will permit of absorption of wholesome products." In addition, these processes occur so that, with the exception of taking food and expelling ejecta, the normal individual is entirely unaware of them.

The functioning of the normal digestive tract is an excellent example of a coördinated mechanism. From the time the crude food materials are taken into the mouth until the ejecta are expelled from the body, the processes of muscular contraction and relaxation, secretion of the various digestive juices, both in the gastro-intestinal tract itself and from the accessory digestive organs, and the absorption of the final products of digestion, are beautifully timed so that the ingested food moves along the digestive tube at

\*From the Division of Experimental Medicine, The Mayo Foundation, Rochester, Minnesota. Presented in a Symposium on Peptic Ulcer before the annual meeting of the Minnesota State Medical Association, St. Paul, Minnesota, May 3, 1937.

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just the proper speed for trituration and mixing with the enzymes which are poured out at the correct time in a medium with exactly the proper chemical reaction to permit the disintegration of the ingesta chemically into substances which not only can be absorbed into the blood and lymph, but which are also innocuous to the body and capable of being metabolized. I will review briefly the pertinent facts concerning the mechanism of the upper portion of the gastro-intestinal tract which appear to be of significance in ulcer.

The process of digestion begins with the secretion of saliva and trituration of the food in the mouth. When the bolus of food is passed into the esophagus, voluntary control over it ceases and does not again occur until the indigestible portion is ejected. The main functions of the stomach are: (1) to store ingesta, (2) to permit salivary digestion to proceed for a longer period of time, (3) to secrete an enzyme for coagulating certain foods, such as milk, in the stomach of the young and thus by making it more difficult for such food to leave the stomach give opportunity for gastric digestion to occur, and (4) to secrete hydrochloric acid and pepsin which furnishes one of the two important mechanisms for digesting protein.

Ingesta, upon entering the stomach, pass over the shortest route and the path of least resistance, which is along the lesser curvature, toward the pylorus. If the entering material is fluid, it passes through the pylorus within a short period of time. If the food is composed of solid material, passage into the duodenum awaits the development of pressure within the stomach produced by muscular contraction and relaxation of the pyloric mechanism. The movements of the stomach have three functions; (1) trituration of the contained food materials, (2) mixing the food with gastric secretion, and (3) expelling the food from the viscus. The movements of the stomach are quite complex, and suffice it to state here that they are weak and shallow in the fundic wall, where they tend simply to adapt the size of the stomach to the amount of contained material, and are strong and vigorous in the pyloric region, where they sweep the gastric content into the duodenum.

The mechanism permitting the food to pass into the pylorus is not thoroughly understood. In this connection the pyloric sphincter should

not be considered as the only important factor in controlling the passage of gastric content into the duodenum, as the sphincter can be removed without greatly altering the emptying rate of the stomach, but the whole pyloric region is involved in the emptying of the stomach. While the theory of chemical control of the pyloric mechanism is generally discredited and the belief that the composition of the gastric content is more important in producing relaxation of the pyloric mechanism in order to permit passage of material from the stomach into the duodenum, an unprejudiced view, taking into consideration the proven facts, would indicate that several factors are responsible and no single factor is essential. The most important consideration to be emphasized is that the movements of the stomach are normally very orderly and change the ingesta into a suitable state and pass it into the duodenum at a suitable rate for the proper functioning of the intestine.

The normal movements of the duodenum are not fully understood. It is surprising to find how little exact knowledge can be obtained in regard to the movements of this portion of the intestinal tract. It can be demonstrated that powerful peristaltic movements can occur and that reverse peristalsis is a normal occurrence in the duodenum, but the character and extent of the motor activity of the duodenum during the passage of a normal meal have not been as carefully studied as in the remaining portion of the intestine. However, it would appear that the duodenum is capable of sweeping the gastric content that is expelled into it rapidly into the jejunum, or if not properly prepared, returning it to the stomach.

The secretory mechanisms of the gastro-intestinal tract are as carefully coordinated as the motor mechanisms and are even more important in regard to the formation of the peptic ulcer. The fundic mucosa secretes most of the gastric juice, including the two most important constituents, hydrochloric acid and pepsin. The pyloric mucosa secretes a small amount of a slightly alkaline fluid containing mucus and pepsin. The duodenal mucosa secretes mucus and several enzymes. The bile, with its three major constituents, bilirubin, cholesterol and bile salts, and the pancreatic juice, with its three important enzymes, inactive trypsin, amylase and

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steapsin, are poured into the duodenum just beyond the pylorus.

The digestive enzymes can be divided into two groups in regard to the reaction of the medium for their optimal action. Pepsin requires a medium with an acid reaction, while all the other enzymes act in a neutral or slightly alkaline medium. It is obvious that there must be some region between the two in which the reaction of the content of the gastro-intestinal tract is changed from acid to alkaline. This region is the ulcer-bearing area, the region which forms the battleground for the chemical conflict between acid and alkali. Most of the acid which is secreted by the fundic mucosa is buffered or neutralized by the food. The acidity is further slightly diminished as the gastric content passes through the pyloric region of the stomach, although the reaction of the chyme in this region is usually acid. The main mechanism for transforming the reaction of the gastric content from acid to alkaline is encountered just beyond the pylorus. There are three main factors in this mechanism: (1) the bile which acts mainly as a diluent, (2) the pancreatic secretion which dilutes, buffers and neutralizes the acid, and (3) the duodenal secretion which acts similar to, but to a considerable degree less than, the pancreatic secretion. It should be noted that, normally, there are coördinating mechanisms which control this acid-alkali mechanism so carefully that the pH of the content of the intestine distal to the duodenum is acid for only very short intervals of time.

I should like to emphasize a few facts mentioned in this brief review of the physiologic mechanisms of the upper gastro-intestinal tract because they are pertinent to the theoretical considerations upon which the first operative procedures which were fruitful in producing peptic ulcer experimentally are based. It should be noted that, anatomically, the musculature of the pyloric region is exceedingly well developed and the peristaltic waves in this region are strong and vigorous, expelling the gastric material from the stomach with force. There is no doubt in the mind of anyone who has observed the rapid and vigorous peristaltic movements of the pyloric region, as compared to the remaining portion of the digestive tract in a visceral organism which is free from inhibitory control of the central nervous system, that the mucosa of this

region of the tract may be subjected to greater mechanical trauma than the mucosa elsewhere and that the duodenal mucosa adjacent to the pylorus may be subjected to gastric content expelled with great force. It should also be noted that the content of this region located on each side of the pyloric sphincter is subjected to very rapid changes of a fairly wide range in pH. While, normally, the time during which the mucosa is exposed to an acid medium is relatively short, an injury to the acid-reducing mechanism may greatly prolong the period of exposure.

It should be recalled that, anatomically, the fundic mucosa which secretes the acid is very loose, in order to accommodate the varying size of the stomach, and thus forms folds which protect an injured surface from the gastric content which passes over it, permitting healing. On the other hand, the pyloric mucosa is stretched tightly in some areas, especially at the lesser curvature, so that an injured area is always exposed. Furthermore, the lesser curvature is more or less stationary at the pyloric region, so that all the material that leaves the stomach is forced to pass over one small area.

**Methods of Producing Chronic Peptic Ulcer Experimentally**

Several successful methods have been developed for producing peptic ulcer experimentally. Recently it has been found that peptic ulcer, mainly gastric and rarely duodenal, follows the administration of large doses of cinchophen. These ulcers are similar to the lesion found in man in regard to location and gross and microscopic appearance. While the complete life history of the ulcers which follow the administration of cinchophen has not been learned, in general, with the exception that they occur mainly in the pyloric mucosa, it appears to be the same as that of the ulcers produced by the methods to be described later. Studies of the ulcer which follows the administration of cinchophen give promise of being very valuable because the ulcerations occur in the gastric mucosa and are associated with an initial gastritis which also appears to occur in the patient with ulcer.

Most of the facts that have been learned about the experimentally produced ulcer were obtained by studies of the lesion which follows certain methods of interrupting the coördinated mechanism of the gastro-intestinal tract previously de-

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scribed. It has been found that if the acid-alkali balance at the pylorus is broken, that is, if the acid gastric content is caused to be expelled into a loop of intestine that does not have the protection of the alkalinizing mechanism, a chronic peptic ulcer will develop in the intestinal mucosa at the site where the gastric content impinges. This condition can be brought about by many different types of operative procedure. The ulcer can be caused to develop in the duodenum, jejunum or ileum. It can be produced in either the functioning intestinal tract or in an isolated loop from any portion of the tract anastomosed to the stomach or a fundic pouch. The facts I shall cite in regard to ulcer have been learned by experimental investigations employing the operative methods of producing the lesion.

### General Characteristics of the Experimentally Produced Ulcer

The ulcer is grossly and microscopically similar to the lesion as seen in man. The site of formation of the lesion is very constant. These ulcers always are found just distal to the point of emergence and in the direct pathway of the gastric content. Usually only one ulcer occurs, but sometimes a contact ulcer is present and rarely three ulcers are found. The ulcer usually develops rapidly, and from the time of the first visible signs of mucosal injury to the time a well-formed lesion has developed may be but a day or so. The base of the ulcer is usually markedly indurated. After being fully formed the lesion will persist for months unchanged. The ulcer will heal very rapidly if fully protected from contact with the gastric content. It will also heal slowly if partially protected from contact with the gastric content.

### The Life History of the Experimentally Produced Ulcer

The development of successful methods for the experimental production of chronic peptic ulcer has made possible the study of the complete life history of the lesion. Only a brief description of the processes of development and healing of the ulcer can be given here. The ulcer has been observed through the various stages of its development from the time it could just be recognized as a pathologic process up to several months after it had the characteristic ap-

pearance of the chronic lesion. Then, in turn, the healing process of the chronic lesion has been observed in detail until restoration was so complete it was impossible to recognize grossly that an ulcer had existed.

The ulcerating process always begins at the surface of the mucosa. At first, all that can be seen is an oval or circular area covered with a homogenous gray membrane. Microscopic examination of the lesion at this stage shows that this membrane is very thin, involving only the surface cells, and that it is composed of mucosal cells in various stages of necrosis, leukocytes and erythrocytes. With the exception of small areas of hemorrhage between the tubules just beneath the membrane, the rest of the tissue appears normal. If the membranous layer is gently sponged and rubbed off, a slight depression is uncovered where the surface of the mucosa has disappeared and which bleeds profusely. This formation of gray membrane composed of cell débris is constantly occurring and the surface of the membrane which is older and consists of the more severely injured cells is constantly being eroded by the gastric content passing over it. The ulcer is saucer-shaped until the muscularis is reached. The muscularis is at first penetrated by the pathologic process to a slightly greater extent peripherally than the mucosa, undermining the latter and causing the characteristic punched-out appearance of the fully developed lesion. In association with penetration of the mucosa, infiltration of leukocytes, and proliferation of fibroblasts and mucosal cells, occurs at the periphery of the injured area. Shortly after the ulcerating process has started, bacteria in varying numbers can be found at the periphery of the lesion and the amount of fibroblastic proliferation appears to depend to a considerable extent upon the degree of secondary infection.

While it has been necessary to describe the development of the ulcer by stages, it really is a continuous process, the essential features of which are identical in all lesions. This same statement also applies to the process of healing of the ulcer. As a matter of fact, the healing process occurs concomitantly with the developing process, but the lesion does not heal unless it has been partially or completely protected from the gastric content or, if the ulcer follows the administration of cinchophen, withdrawal of the drug. In the unprotected ulcer, the delicate grow-

ing edge of granulation tissue, covered with a single layer of mucosal cells, which is the initial stage of the healing process, is injured and swept away by the gastric content as soon as it has progressed beyond the protecting edge of the periphery of the lesion.

Within just a few hours after the ulcer has been protected from gastric content flowing over it, the base of the ulcer is covered with a thin fibrinous membrane, the leukocytes and bacteria begin to disappear beneath this protection, and the growing granulation tissue and mucosa are able to advance from the periphery over this membrane covering the base. The granulation tissue grows faster than the mucosa, and eventually fills the whole ulcer and usually extends over the edge of the lesion. Concomitant with the proliferation of the granulation tissue, the periphery of the lesion moves inward, becoming greatly shortened.

The growing edge of mucosa consists of a single-celled layer of flat cells, which are not at first attached to the supporting granulation tissue. While proliferation of the mucosal cells appears to occur throughout the growing surface, it is fastest at the periphery of the ulcer, so that the advancing edge of mucosa seems to be pushed over the surface of granulation tissue. Sufficient pressure is soon developed in this most rapidly proliferating area so that simple folds of mucosa appear adjacent to the normal mucosa at the periphery of the ulcer. The first fold at the growing edge of the ulcer and nearest the center of the lesion usually has an elongated slope on the side of the advancing edge that is very characteristic. As previously stated, the growing edge of granulation tissue usually overflows the sides of the ulcer, giving a mushroom appearance. When the growing edge of mucosa which is protected by overhanging granulation tissue reaches the stalk of this mushroom, it passes upward and may cover the whole surface of the granulation tissue, even that portion which is beyond the edge of the ulcer. Eventually, however, the stalk of the mushroom of granulation tissue is squeezed off with its covering of mucosa and is discarded, leaving the whole surface of the lesion covered with the mucosa which has been developing under the protection of the granulation tissue. When the granulation tissue has filled the base of the ulcer completely, the lesion can be recognized by the raised, pearly white

appearance of the newly formed tissue. The healing tissue is very delicate at this stage and can be washed out by dropping water upon it with a medicine dropper, leaving the appearance of the ulcer almost identical with that before the lesion was protected. The whole healing process occurs in a very orderly fashion and, when completed, the site of the ulcer, as has been said, usually cannot be distinguished grossly. Microscopically, the site of the lesion can be recognized because the restored surface of the mucosa is thinner than normal, contains atypical villi and, since smooth muscle does not regenerate, the mucosa over the ulcerated area rests on a connective tissue base instead of the muscularis mucosae.

#### **Important Facts that Have Been Learned from Studies of Experimentally Produced Ulcer**

Lack of space permits but brief statements of the facts that have been learned from experimental studies of ulcer. These statements, unless qualified otherwise, apply specifically to ulcers that have been produced by interruption of the acid-alkali mechanism at the pylorus:

1. Ulcer rarely follows diversion of bile from the duodenum, but acute ulcers are frequently found in the condition of jaundice following obstruction of biliary outflow.
2. Acute duodenal ulceration frequently follows the complete loss of pancreatic secretion from the body, but rarely occurs if secretion of the pancreas is prevented by obstruction to the outflow of pancreatic juice.
3. Ulcer occurs in a small percentage of instances in which the duodenum is removed.
4. Ulcer frequently occurs in the duodenum if the bile and pancreatic ducts are drained into the terminal ileum.
5. Drainage of the entire duodenal content into the terminal ileum causes ulcer to form in almost every instance in the jejunum or ileum which has been placed in the position previously occupied by the duodenum.
6. The site at which the ulcer develops is so remarkably constant that it is possible at operation to indicate accurately where the ulcer will form.
7. By changing the angle of the loop of gut anastomosed to the stomach it is possible to change the site where the ulcer will occur and to indicate this area at the time of operation.

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8. Varying the size of the opening through which the gastric content is expelled changes the rate at which the ulcer forms. The ulcer occurs more rapidly with the smaller opening.

9. Injury to the motor mechanism of the stomach, such as making an hour-glass stomach, delays but does not prevent the development of ulcer.

10. Resistance of the intestinal mucosa to ulcer decreases progressively from the pylorus to the colon.

11. The loop of intestine anastomosed to the stomach can be turned at different angles in relation to its blood supply without affecting the site at which the ulcer develops.

12. An incision can be made repeatedly within short intervals of time in the loop of intestine containing an ulcer opposite the lesion and the ulcer observed. The incision heals but the ulcer does not.

13. An ulcer will show evidence of healing within a few hours after it has been completely protected from contact with the gastric content.

14. An ulcer will heal slowly if the duodenal content is drained so it will pass over the lesion.

15. An ulcer will heal slowly following a gastro-enterostomy.

16. When an ulcer is made to heal by preventing the gastric content from passing over it, another ulcer usually develops in the efferent loop of intestine in the pathway of the gastric content of the gastro-enteric anastomosis made to drain the stomach. It should be noted that the site of the new ulcer was subjected to the same condition as the site of the original.

17. The healing process in an ulcer completely protected from gastric content is rapid, orderly, progressive and similar in the different lesions.

18. The healing process in an ulcer only partially protected from contact with the gastric content is irregular and slow, with many complications, such as reformation of a portion of the ulcer and hemorrhage.

19. During the healing process the newly formed tissue is very delicate and can be washed out of the ulcer with unbelievable ease.

20. Removal of all the fundic mucosa except a narrow tube for the passage of food greatly delays the formation of the ulcer but does not prevent its occurrence.

21. If an isolated fundic pouch is drained by

an isolated loop of intestine, ulcer will occur in the intestinal loop.

22. If an isolated pyloric pouch is drained by an isolated loop of intestine, ulcer does not occur.

23. Ulcer will occur after section of the nerves to the stomach.

24. A diet of coarse food will increase the rate at which an ulcer develops, while a liquid diet retards the rate of ulceration.

25. Patches of jejunum, transplanted into the wall of the fundic portion of the stomach, do not become ulcerated.

26. Patches of jejunum, transplanted into the lesser curvature of the pyloric portion of the stomach, frequently do become ulcerated.

27. Patches of the fundic region of stomach, transplanted into the wall of the jejunum or ileum, produce ulceration in the intestinal mucosa.

28. Areas from which the mucosa is excised heal more rapidly in the fundic region than in the ulcer-bearing area of the pyloric region.

29. All the major complications of ulcer, as noted in the human, have been observed in the experimentally produced lesion.

30. Finally, it should be emphasized that these experimentally produced ulcers cannot be distinguished grossly or microscopically from ulcer as seen in man.

This large amount of accumulated data indicates conclusively that chronic peptic ulcer can be produced experimentally by interrupting the chemical coördinating mechanism whereby the acid gastric content is diluted, buffered and neutralized as soon as it leaves the stomach. Ulcer occurs in a mucosa subjected to the action of the acid gastric content and unprotected by the acid-reducing mechanism. Ulcer does not occur in the absence of acid or in the presence of this mechanism for reducing acidity. The motor mechanism of the stomach is important in determining the site of the lesion, the ulcer occurring in the area on which the acid gastric content first impinges upon leaving the stomach and the rate of progress of the lesion, the ulcer forming more rapidly where the acid gastric content is expelled with greater force. The force with which the content of the stomach is expelled is modified by the size of the opening of emergence, being greater with the smaller opening.

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### Complications of Experimentally Produced Ulcer

As previously stated, all the complications of peptic ulcer as seen in man have been observed in the experimentally produced lesion. The more important complications are perforation of the lesion and hemorrhage from the ulcer.

*Perforation of the ulcer.*—A very high percentage of experimentally produced ulcers perforate. The perforation may occur very quickly, with resultant leakage of intestinal content and peritonitis. The perforation may pierce another viscous, such as the gallbladder, colon, or a loop of intestine. The perforation usually is closed by the surface of an adjacent organ or, especially, the omentum. In some instances the perforated ulcer shows one or two terraces, indicating that there has been more than one active onslaught in its creation. A few ulcers have even perforated through the abdominal wall, producing a fistula.

*Hemorrhage from the ulcer.*—Hemorrhage from the experimentally produced ulcer is a frequent occurrence and death of the animal from loss of blood at the site of the lesion is not uncommon. The hemorrhage occurs from one of two sources. Rarely, the pathologic process involves an artery, producing necrosis of the arterial wall with a resulting loss of blood. Usually, the bleeding occurs from an injured surface of the granulation tissue in a healing lesion. As previously described, in the healing process the base of the ulcer is filled with a very vascular granulation tissue. Injury to this newly formed vascular bed occurs very easily and may be followed by a hemorrhage of sufficient magnitude and continued for a long enough time often to cause death. The ulcers more prone to bleed are those healing under a condition of partial protection. For instance, if gastro-enterostomy is carried out on an animal with ulcer, thus diverting a portion of the gastric content from passing over the lesion, the ulcer will slowly heal. While the ulcer is in the process of healing the gastric content that does pass over the lesion frequently injures the delicate growing and developing

granulation tissue in the base and a hemorrhage often ensues. A coarse diet is more prone to cause bleeding than a liquid one. The fully protected healing ulcer, that is, a lesion from which gastric content is completely excluded, has never produced a demonstrable hemorrhage in our experiments.

### Summary

Studies on the experimentally produced peptic ulcer have proven that the site, character, extent, processes of development and healing depend almost exclusively upon an anatomic and physiologic basis. The important factors in the development of the lesion are chemical and mechanical. The typical lesion occurs in a mucosa exposed to acid gastric content which is not protected by the mechanism for diluting, buffering and neutralizing the acidity of the gastric content. It never occurs in a mucosa not exposed to acid gastric content. The ulcer begins with injury and destruction chemically of the surface cells of the mucosa with which the acid gastric content comes in contact. The site of the ulcer is determined by the mechanical factor of expulsion of the gastric content, that is, it occurs in the area where the gastric content first strikes after emergence from the stomach. Progression of the lesion is due to the mechanical eroding away of succeeding layers of injured surface cells and chemical injury to the living cells previously protected by the dead cells above. Limitation of the lesion is determined by the area over which an effective degree of acidity for cellular injury can be maintained. Chronicity of the lesion is produced by the same two important factors producing the lesion, by destroying chemically and washing away mechanically the delicate newly formed proliferating cells as soon as the healing edge has progressed beyond the periphery of the ulcer. Healing of the lesion always occurs immediately after protecting it from the acid gastric content.

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## X-RAY DIAGNOSIS OF ULCER\*

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POSITIVE diagnosis of ulcer, whether of the stomach or duodenum, depends upon the demonstration of the crater plus the sclerotic area of induration or thickening of the gastric wall. Scar tissue in itself may be of importance, but does not lead to the positive diagnosis of open ulceration. Figure 1 shows an ulcer in the middle of the lesser curvature of the stomach, in which we have the crater (*A*) and then surrounding this the area of induration (*I*) which completely surrounds the crater or the hole in the wall of the stomach. The crater of the ulcer may vary considerably in size, and the area of induration with similar sized craters may also vary in size, but on the whole we find that in the benign ulcer, the crater of the ulcer is centric to the area of induration and there is a certain relation of the size of the ulcer to the size of the induration. These facts are fundamental and are true of peptic ulcer regardless of its situation.

Figure 2, (*A*) shows the ulcer-bearing area of the stomach and of the duodenum. In the stomach it follows the lesser curvature, running both onto the anterior and the posterior wall, from the cardia to the pylorus. In the first portion of the duodenum, however, the ulcer-bearing area is a ring-like area of the duodenal wall situated about one-quarter to one-half inch beyond the pyloric valve and about one-quarter or three-eighths of an inch in longitudinal length.

Figure 2 (*B*) illustrates the ulcer high up on the lesser curvature of the stomach, the area of induration in this instance extending from the cardia to an equal distance below the crater of the ulcer. Dashes represent the distribution of the area of induration. We have indicated, also in the dotted lines, the type of scar tissue, hour-glass contracture, which may develop with this type of ulcer. The contracted area at the pylorus is due to spasm of the pyloric canal. This type of spasm is frequently produced by ulcers higher up on the lesser curvature of the stomach.

Figure 2 (*C*) illustrates two ulcers. The upper

one is in the proximal part of the antrum and the crater is centric to the surrounding area of induration. When scar tissue forms here, as indicated by the dotted lines, it cuts across the stomach, forming an hour-glass contracture, and one can see that in comparison with *B*, in which gravity can help to drain the upper pouch, in *C* gravity does not help to drain the upper pouch. The second ulcer in Figure 2 (*C*) is directly in the pyloric valve and here the area of induration runs both into the wall of the cap or first portion of the duodenum and back into the stomach.



Fig. 1. Ulcer of lesser curvature (*A*) of body of the stomach. Area of induration (*I*). Cap (*C*) shows scar tissue deformity from ulcer.

Figure 2 (*D-1*) illustrates the ulcer in the distal part of the antrum or the pyloric canal. In contrast with the ulcer higher up on the lesser curvature, which very frequently may have associated spasm of the pyloric canal, those ulcers in the region of the pyloric canal do not usually produce this spasm. Ulcers in the pyloric canal usually heal without leading to fibrous stenosis. Figure 2 (*D-2*) shows the typical ulcer of the cap, the crater on the anterior surface, and the area of induration which extends throughout the wall of the cap. When the ulcer is close to the pyloric valve, the induration may extend back

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into the wall of the stomach. By the dotted lines, on the greater curvature side, we have indicated the hour-glass type of scar tissue contracture which very frequently accompanies this type of ulcer.

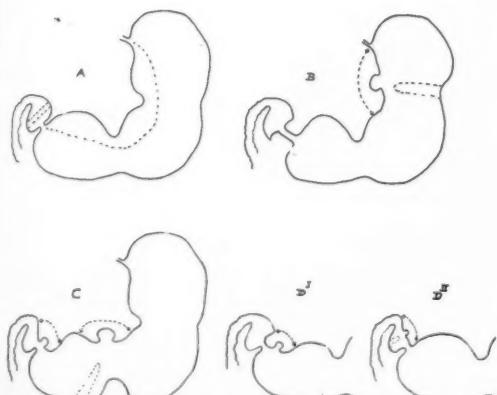


Fig. 2. *A*, Ulcer-bearing area of stomach and cap. *B*, *C*, characteristic ulcers of stomach and cap with associated areas of induration and scar tissue contracture.

Diagnosis of ulcer of the cap is, on the whole, more difficult than diagnosis of ulcer of the stomach. In the stomach we can visualize the ulcer in profile; in the cap we have more difficulty visualizing the ulcer in profile, and also we have more difficulty in seeing the small ulcer.

Figure 3 (*A*) shows the area in which the ulcer usually occurs; then (*B*) the anterior wall ulcer and the area of induration; and (*C*) the posterior wall ulcer. Posterior wall ulcers do not usually have the associated hour-glass contracture. In *D* we have illustrated a point which we will come back to later, the visualization of the crater itself face-on rather than in profile in contrast with *B* and *C*. In *E* we have one of the scar tissue deformities, the so-called clover leaf, which is, as you see, the stage in which the ulcer may be healed, leaving as an aftermath narrow scar tissue bands which constrict the cap in a circular manner. In *F* we have the same type of deformity but with a longer circular constriction of the cap. In *G* we have the half-cap; in other words, an ulcer similar to *B* which is healed, leaving one half of the cap, the other half being obliterated by scar tissue formation. In judging the importance of the findings diagramed in *H* we have one of the most difficult problems. We have indicated here both the profile of the cap in full and the bands of scar

tissue. These bands of scar tissue may be seen as a multiple lobulation of the cap similar to *E*, or we may see them only as radiating folds of mucosa, the outer wall margin of the cap not being deformed. In Figure 3 (*H*) we have indi-

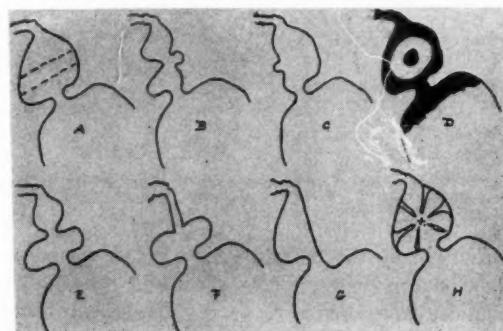


Fig. 3. *A*, Ulcer-bearing area of cap. *B-H*, characteristic deformities of the cap produced by ulcer.

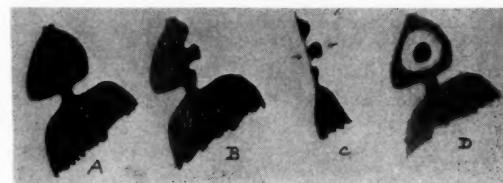


Fig. 4. Recently formed ulcer of the cap in which the crater is best demonstrated "en face" by use of pressure technic.

cated a small depression at the site of convergence of the radiating folds. It may represent an active ulcer or it may represent a depression which is covered with epithelium, a healed ulcer. If we do not see a crater or this depression at the center of convergence of bands of scar tissue, we are still unable to say that the ulcer is completely healed. In the deformed cap new defects may exist which we cannot visualize. For these reasons in the presence of scar tissue in the duodenum when the typical symptoms of ulcer are present, I think we must consider that active ulcer does exist, particularly when tenderness is present on pressure over the cap, even though we cannot visualize the crater.

As to the visualization of the crater, face-on in the duodenum, recently formed ulcers may not show in profile, the cap having a perfectly normal contour as shown in Figure 4 (*A*). Figure 4 (*B*) shows the deformity produced by the ulcer if we were able to visualize it in profile. In *C* we have diagramed in profile the pressure

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technic. This may be intentional or it may be accidental. Pressure is exerted in two directions against the ulcer so that the opposite walls of the cap come in apposition in the area of induration around the crater, blocking out the shadow



Fig. 5. A, Area of induration (dotted lines) before formation of ulcer crater. B, Crater of Ulcer ( $U^I$ ). C, No residual deformity after healing of ulcer.

produced by the barium. As a result we have, as shown in Figure 4 (D), the crater showing as a bullet hole filled with barium, the area of induration showing no barium, and a faint rim of barium around the area of induration. This is a very common finding of ulcer in the duodenum, particularly when it is the first ulcer and has been present only a short period of time.

In order to explain in terms of gross pathology the unusual x-ray findings which are sometimes observed, particularly in ulcer of the stomach, it is necessary to understand the pathogenesis and life history of the ulcer as it is observed by x-ray examination.

We believe that these ulcers develop first as an area of necrosis in the wall of the gut, this area of necrosis being surrounded by an area of inflammation which thickens the wall. At this stage the only x-ray findings are a rigidity or lack of pliability of the wall and a slight indentation into the lumen of the gut by the thickening of the wall. Then this area of necrosis discharges its contents after rupture of the mucous membrane. During a certain stage the cleaning out of the crater of the ulcer is incomplete, and x-ray examination shows a hole extending from the lumen of the stomach, the margins of this hole being ragged and fissure-like. When the ulcer is characteristically formed, we have the smooth crater with a surrounding area of thickening and induration. Early in the life history of an ulcer the area of induration is made up of young connective tissue and is relatively soft or pliable. As healing goes on, this young connective tissue becomes old connective tissue or scar tissue and contracts so that it gradually cuts down the size of the crater and ap-

proximates the edges of the crater. Healing is also accomplished in part by granulation tissue which forms in the base of the ulcer, gradually filling the crater with connective tissue.

Figure 5 (A) illustrates the x-ray findings in

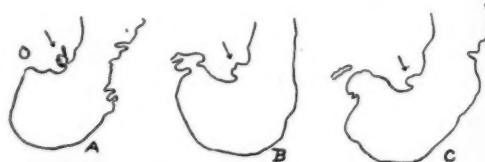


Fig. 6. Appearance of crater of gastric ulcer at successive stages in extrusion of necrotic core of the ulcer.

the stage before the ulcer crater has formed. In this case we found a small ulcer ( $U^I$ ) in the pyloric canal, and the individual was put to bed under treatment. Subsequently the symptoms did not disappear and examination made a month later (B) shows a larger ulcer ( $U^{II}$ ) in the lesser curvature wall of the body of the stomach, the other small ulcer being healed and leaving a small residual area of induration. This new ulcer went on progressively to healing (C). In other words, at the first examination we missed the area of protrusion into the lumen of the stomach. Figure 5 (A) (dotted lines) represents the area of induration preceding the actual discharge of the necrotic material from the core of the ulcer.

Figure 6 illustrates successive stages in extrusion of the necrotic core of the ulcer. In (A) the crater is ragged in outline, the barium extending into fissure-like crevices in its base. After one week (B) the necrotic material had been discharged except for a little debris in the bottom of the crater. After three weeks (C) we have the usual ulcer findings, the smooth crater of characteristic shape and the well-defined associated surrounding area of induration.

As healing of the ulcer proceeds, the crater of the ulcer gradually diminishes in size due to scar tissue contraction in the area of induration and granulation tissue which fills the crater with connective tissue. These two processes may proceed equally rapidly, in which case the crater becomes concentrically smaller until it finally disappears. Scar tissue contracts the neck of the ulcer more than the base so that the opening into the crater has a smaller diameter than the crater. When this characteristic finding is observed, one can tell from a single examination

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that the ulcer is a healing ulcer. The two processes of healing sometimes do not proceed equally rapidly. When the granulation tissue forms rapidly, the crater may fill in and disappear without showing any constriction of the neck of the ulcer. When the granulation tissue

there is more constriction of its neck. On the thirty-sixth day of healing the crater has become quite small (*C*), and eventually healed in sixty days.

The ulcers of the stomach which we have illustrated are deep; that is, they penetrate the

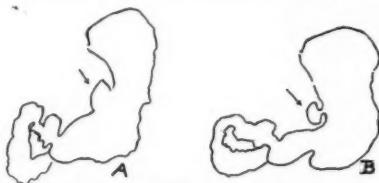


Fig. 7. *A*, Recently formed large gastric ulcer. *B*, The changes in shape of the crater of same ulcer due to slow healing.

forms slowly (slow healing of the ulcer—chronic ulcer), there is a proportionately more marked contracture of the neck of the ulcer, and a fairly large crater may communicate with the cavity of the stomach through a very narrow lumen. In the stomach, particularly, almost all ulcers tend to heal. The time period necessary for healing depends upon the original size of the ulcer and the treatment. Bands of scar tissue may produce narrow contractures which encircle the wall of the gut, producing the hour-glass deformity of the stomach and cap.

Figure 7 illustrates the changes in the crater of the ulcer which occur when healing is slow. In *A* there is a large ulcer of the lesser curvature high up in the body of the stomach. One can tell from its general appearance that it is a recently formed ulcer. The crater is unusually large. After several months we find the picture diagramed as shown in *B*; a smaller crater pinched off at its neck; in other words, a crater in which scar tissue contracture has been predominant in diminishing the size of the crater. In this instance the filling in of the crater with granulation tissue has been slow. This is a chronic ulcer and not a normally healing ulcer.

Figure 8 illustrates normal healing of an ulcer and the resultant change in the crater. *A* shows the ulcer with a large crater as it was first observed. Because of the slight constriction at the neck of the crater, one can tell that this is a healing ulcer and was originally larger. At the time of the first examination the patient was put to bed under medical treatment, and x-ray examinations were made at three to five day intervals. On the twentieth day the crater had become symmetrically smaller (*B*), and



Fig. 8. The changes in shape of the crater of a gastric ulcer produced by normal healing.

muscularis propria of the stomach. Yet there is no perforation of the stomach into the peritoneal cavity. Most ulcers of the stomach are deep, but they usually do not perforate the stomach due to the fact that in the gastro-hepatic omentum there is a loose areolar connective tissue in which the protective inflammation can develop and protect against rupture into the peritoneal cavity. Ulcers in the stomach which develop posteriorly or anteriorly beyond or close to the reflexion of the gastro-hepatic omentum may perforate. In the duodenum, of course, ulcers rupture more frequently because they may occur at a site in which the peritoneum is firmly adherent to the outer muscle wall.

Minute ulcers or erosions produce small defects in the barium outline of the lumen of the stomach. Very frequently, these small ulcerations are multiple. From both the x-ray and the pathologic standpoint it is difficult to draw a line between erosion and true peptic ulcer. We have come to feel that these small minute lesions of the stomach (and duodenum) represent an ulceration of the mucosa in the presence of an inflammatory or degenerative process and are part of an ulcerative gastritis. The x-ray picture of the mucous membrane as a whole may be that of either a hypertrophic or atrophic gastritis.

The most important differential diagnosis is between peptic ulcer and carcinoma of the stomach. Our basis for the differential diagnosis of benign ulcer and carcinoma lies entirely in the form of the crater, the form of the surrounding area of induration, and the eccentric position of the crater in carcinoma as compared to the centric position of the crater in benign ulcer.

## PEPTIC ULCER: MEDICAL MANAGEMENT

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COMPETENT medical authorities have conservatively estimated that about 10 to 12 per cent of all individuals suffer at some time in their lives from a chronic gastric or duodenal ulcer, or both. Naturally, the medical profession always has been deeply concerned with the treatment of such a highly prevalent disease, affecting as it does the health, efficiency, and life of many adult members of every community. Obviously all individuals so affected do not come under the scrutiny of a physician because in many cases the symptoms are mild or permanently disappear after short periods of trouble. From combined clinical and postmortem observations it is known that some patients never present any tangible symptoms whatsoever.

To recount briefly certain observations bearing on diagnosis and treatment may not be amiss. Peptic ulcer is a disease of highly civilized people. When it does afflict persons of more primitive races it is usually attributable to nutritional or dietetic shortcomings, as has been pointed out by McCarrison and by Bergsma. The American negro, transplanted from his usual rural environment in the South, where he is comparatively immune to the disease, to the more intensive industrial milieu of the North, becomes increasingly susceptible to peptic ulcer, according to recent observations by Steigmann. This apparent environment influence has led to the belief in many quarters that ulcer is a psychosomatic disease; that is, it is largely of psychogenic origin. Ulcer afflicts men four times as frequently as it does women, and in our country at least duodenal ulcer is twelve times more frequent than gastric ulcer. As a matter of comparison, gastric carcinoma is three times more frequent than gastric ulcer. The post-operative recurrence of ulcer is eleven times as frequent among men as it is among women. The preponderance of duodenal over gastric ulcer, and the fact that the former is more refractory to treatment, generally speaking, has led many phy-

sicians to assume the mental attitude expressed thus: "Once an ulcer, always an ulcer." To a certain extent such a viewpoint is justifiable.

### Correct Diagnosis

Effective treatment, among other things, presupposes correct diagnosis and proper choice of patients for the methods of treatment selected. Identification of the majority of both gastric and duodenal ulcers should be fairly easy in view of the characteristic syndrome. The combined effort of the internist and the experienced roentgenologist makes identification and localization of these lesions possible in 90 to 95 per cent of the cases, and in less skillful hands in at least 75 per cent. Conditions which most frequently simulate peptic ulcer and which must be excluded in the absence of roentgenologic confirmation of the presence of an ulcer, are functional or nervous gastric disorders, often characterized by antral spasm, pylorospasm, and hyperchlorhydria, the types of dyspepsia that may arise from the abuse of tobacco and irritating foods, chronic gastritis or duodenitis, alimentary allergy, hiatus hernia, cholecystic disease, and esophageal ulcer. Less likely are hypoglycemia and a bleeding ulcer in a Meckel's diverticulum. In doubtful cases observation in hospital often clarifies the diagnosis.

### Proper Choice of Patients

As a rule, all patients who have uncomplicated ulcers, especially if the symptoms have been of short duration, and all younger individuals, should first have the benefit of adequate medical treatment. The same is true, in large measure concerning treatment of the more common uncomplicated lesions of older patients, especially if the manifestations are mild and infrequent, not progressive in severity, and do not interfere with the efficiency of the individual. Likewise, medical treatment usually is indicated for such lesions in the aged and in those who have serious, advanced, organic disease, such as active pulmonary tuberculosis, angina pectoris, diabetes mellitus, advanced chronic nephritis, marked obes-

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ity, and decompensating cardiac lesions. Moreover, treatment in the presence of pregnancy should be medical. The highly neurotic individual, whose complaints often are more the result of his psychoneurotic state than of his ulcer, and who infrequently obtains satisfactory results, should not be operated on, as a rule, although usually he is also difficult to treat medically. Many individuals who have late post-operative recurrence, not of formidable nature, are relieved successfully by nonsurgical measures. Then there are those who choose their own therapeutic procedure; that is, they refuse operation even though it may be definitely indicated, and there is no alternative but to carry out medical treatment and hope for the best. Close co-operation between internist and surgeon, manifestly more frequent now than it has been in the past, makes for more critical selection of patients for any particular form of treatment, as a consequence of which the results are uniformly better.

#### Methods of Medical Treatment

While clinical and experimental observations have fairly well established the mechanism by which ulcer is produced, the ultimate cause of ulcer still is unknown. As a result, treatment is in a sense empirical, newer methods are continually being advanced and frequently are exploited by commercial interests, and there is no general agreement as to the best procedure. Therefore, the physician is often perplexed as to what method of treatment to follow. Shall he continue along conventional lines, as he has in the past, or resort, for example, to parenteral administration of proprietary preparations of various nature, a procedure now so much in vogue?

The various methods of medical treatment now extant can be classified as follows:

1. Conventional diet-alkali-sedation (modified Sippy regimen).
2. Administration of mucin, duodenal extract, enterogastron, adsorbents (kaolin, aluminum salts).
3. Duodenal or jejunal tube feedings.
4. Continuous, alkalinized milk or aluminum hydroxide solution drip.
5. Parenteral administration of proteins, peptin, insulin, parathyroid extract, vaccines, synodal, histidine hydrochloride.
6. Combined methods.

From my observations, I feel it is safe to predict that parenteral methods of treatment eventually will prove disappointing. The rationale of the use of many of the preparations now on the market is seriously questioned. Protein therapy already has been discredited and discontinued in many quarters. Mucin, too, has had only a short-lived popularity and its use is being gradually discontinued. It seems to me that synodal has lost favor and that larostidin is under fire. It is true that any of these substances at times may give relief and temporarily may appear to have curative value, but in my judgment they are of limited ultimate value. The other methods enumerated above have been found to be more or less useful, and under certain circumstances are highly essential. The diet-alkali method of treatment is the one employed by the majority of members of the medical profession. There is ample clinical, experimental and surgical evidence that any procedure which adequately will control or neutralize excess gastric acidity and secretion, and which in turn usually will correct any impairment of gastric motor function whenever present, promises the greatest success. Modification of Sippy's original method was necessary in order to avoid alkalosis and other physiologic or nutritional disturbances. It was also recognized that complete neutralization was not necessary to promote healing. Dragstedt has shown that the threshold value for the digestion of living tissue lies between 0.10 and 0.15 per cent of free acid (97 to 146 mg. of acid chloride per 100 c.c.). Moreover, it is realized that the judicious use of sedatives and antispasmodic substances, at least in the initial stages of treatment, is also very important. The details of such treatment, and their modifications, have been described elsewhere.<sup>5</sup>

Another useful adjuvant to the usual methods of treatment is duodenal extract. It is given in triple O gelatine capsules, each containing 15 grains (1 gm.). Two of these capsules are usually given two hours after the principal meals of the day. According to some recent observations by Rivers, this extract seems especially effective in the treatment of jejunal (anastomotic) ulcer.

Other innovations of practical usefulness might be mentioned briefly. In the last two years, powdered whole milk, of which there are several reliable brands on the market, has been

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advocated in place of the standard milk and cream mixture, if the latter does not prove suitable or convenient. The proponents of powdered milk claim that, with its use, neutralization or reduction of acidity is more effective, and the number of daily feedings is reduced almost to half. Each feeding consists of one and one-half tablespoonful of the powdered milk, to which 3 ounces (90 c.c.) of water, and alkalies are added. Tablets of alkalinized, powdered whole milk also may prove effective, according to Wosika. At The Mayo Clinic we have found that these preparations are a convenient substitute for the feedings of milk and cream that have to be taken when away from home between meals; also, in those localities where milk and cream are not readily obtainable.

Substitutes for the alkalies that ordinarily are used often are necessary because some individuals have a low tolerance for alkalies and patients with cardiovascular-renal and hepatic disease, and arteriosclerotic and hypertensive individuals easily may develop alkalosis. When such a complication threatens, one readily can resort to other substitutes, such as tribasic phosphates (tri-calsate) or to adsorbents such as kaolin, aluminum salts, jels or creams. Mutch has extolled the virtues of magsorbent (hydrated magnesium trisilicate) because of its antacid and adsorbent properties and because it can be given in generous doses without disturbing the acid-base equilibrium.

Particularly important in the light of recent researches is the adequate intake of vitamin C, especially if patients have hemorrhagic lesions or tendencies. Blankinship and Oatway have shown that it is feasible to modify milk by the addition of large quantities of orange juice and that such a mixture produces the softest and finest curds. The mixture which these authors have recommended is as follows: milk 24 ounces (720 c.c.), cream 8 ounces (240 c.c.), strained orange juice 10 ounces (300 c.c.), sugar 20 gm. This mixture represents calories 1205, proteins 32 gm., fat 77 gm., carbohydrates 96 gm. Feedings of 6 ounces (180 c.c.) may be taken every two hours from 8 a. m. to 8 p. m. if necessary.

One problem connected with the conventional method of treatment has been its discontinuance during the night, but in spite of this, good results are uniformly obtained in cases in which the patients are suitable for treatment. In re-

fractory cases, the continuous drip method advocated by Winkelstein, by Woldman and Rowland, and by others, should be employed more frequently.

The treatment of profuse gastric hemorrhage has undergone no significant changes. Complete rest, reassurance, hypodermic injections of morphine and atropine, and, in cases of unusually severe hemorrhage, transfusion of whole blood from a suitable donor, still are the sheet anchors. At the clinic we seldom resort to gastric lavage. Dobreff's observations of a woman with an artificial gastric fistula seem to contraindicate application of the ice bag in the presence of gastric hemorrhage. The ice bag caused increase in peristalsis, which sometimes was marked, also hyperemia and increased secretion. A hot water bag had the opposite effect. Revolutionary as it may seem, Meulengracht, of Copenhagen, has made what promises to be an important contribution to the treatment of patients following hematemesis and melena. From the first day after their admission, patients are given a full diet in the form of a purée, together with an alkaline mixture three times daily, and extract of hyoscyamus and ferrous lactate. His procedure has been acclaimed by competent observers at home and abroad, as it definitely shortens the period of convalescence. However, I am still inclined to withhold food for several days after evidence of bleeding has ceased. We have had fairly good results in several cases in which we have used moccasin snake venom.

On infrequent occasions, incomplete or unsatisfactory results during or following treatment are attributable to the fact that the patient is an allergic individual. As milk, egg, and wheat products are so frequently used in treatment, and as they constitute the commoner allergens, sensitivity to foods, as a disturbing factor, always should be kept in mind. Gay went so far as to maintain that peptic ulcer is an allergic manifestation and that the pain of peptic ulcer occurs in the presence of antigenic foods.

### Factors Underlying Successful Treatment

Early diagnosis and prompt, adequate treatment, although often a "counsel of perfection" are obviously all-important. Even as recently as 1932 the late Lord Moynihan stated that the failure of medical treatment was attributable to its insufficiency and that very few patients re-

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ceived any treatment which offered a reasonable prospect of causing healing of the ulcer. Initial treatment in a hospital for three or four weeks, and supervised ambulant treatment for another eleven months, is the program usually carried out at the clinic. Such treatment should be flexible and individualized to the particular needs and reactions of the patient. Ambulant treatment, too, has its proponents, and may prove very effective. The patient, as well as his lesion, must be encompassed in the plan of treatment. The modern physician is concerned not only with healing of the lesion but with keeping it healed and thereby preventing any recurrences. In order to accomplish the latter, at the clinic we have adopted a more or less systematic plan of education while the patient is still in the hospital, whereby he is made fully acquainted with the nature of his disease and with the rationale underlying his treatment, and is given full instructions not only on how to carry out treatment, but on the necessity of it during the ambulant period when he is not under our direct observation. We particularly stress the baneful influence of nervous and physical fatigue, worry, unhygienic habits of living and eating, and the irritant, deterrent effect of alcohol, tobacco, condiments, stimulating or coarse foods, and hur-

ried, improper mastication. Only in this way can consistent co-operation be obtained and better end-results be expected. In treating a large series of suitable patients who undergo such adequate management, one may expect excellent results in at least 75 per cent of the cases.

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## SURGICAL TREATMENT OF PEPTIC ULCER\*

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THE place of surgery in treatment of peptic ulcer requires constant revision. Although the general principles on which surgical operation is undertaken are well established and accepted, the fact that the indications for operation are primarily dependent on, and inseparable from, the status of medical management, requires continuous readjustment of when and how these surgical principles should be applied. The great advances which have been made in the medical management of peptic ulcer have been owing to the many factors which have contributed to better understanding of the disease. Although the cause of peptic ulcer remains elusive,

the circumstances under which it develops and recurs are beginning to assume significance and the course of the disease is more predictable than it has been in the past. There are many reasons for these advances. From the experimental laboratory certain principles in relation to cause of the condition have been established and are constantly applicable to an understanding of peptic ulcer. The rôle of the acid factor was proved beyond any doubt in experiments on diversion of the alkaline fluids from the duodenum by the methods of Mann and his coworkers, and in work on the production of ulcer by cinchophen. Moreover, the effect of both medical and surgical therapeutic measures influencing the production of ulcers has made possible most important observations relating to the factors respon-

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## SURGICAL TREATMENT OF PEPTIC ULCER—BALFOUR

sible for peptic ulcer. Roentgenology has developed beyond the phase of determining whether or not a lesion is present, so that now it is possible to make sharper differential diagnosis of the types of lesions; it is also possible to determine the degree of deformity, the effect of the lesion on gastric function and the relationship of gastritis to ulcer, as well as to demonstrate the effect of surgical procedures. These advances have added immeasurably to better understanding of the disease and its complications.

To the advantages which have come from the indirect methods of roentgenologic visualization are now added those of direct inspection of the stomach by means of the gastroscope. Enough experience with use of the flexible gastroscope now has been gained to give this method of examination a permanent place in the diagnosis of gastric lesions. Frequently the gastroscope will add some useful information about a lesion which is known to be present in the stomach, and in an occasional case in which repeated roentgenologic examinations are negative the gastroscope can prove the presence of a lesion. This should always be kept in mind in cases in which the clinician believes that the symptoms indicate some obscure lesion of the stomach.

More important than all has been the progress which has been made in the medical management of ulcer. This has come chiefly from the repeated demonstration of the fact that with an adequate knowledge of the disease, applications of present day methods of medical treatment, and above all aided by coöperation of the patient, the clinician has been able to increase infinitely the possibility of satisfactory control of the disease.

In evaluation of these important contributions, surgical methods have been essential, not only because of the excellent results of properly applied management but particularly in revealing pathologic changes and thereby making possible intelligent coördination of knowledge, data and findings which may be obtained by other means.

The one basic indication for surgical operation in peptic ulcer at present is failure to control the disease by adequate medical management. Although this is an acceptable principle in practice, it cannot be looked on as the ideal for which modern medicine should strive. The idea to be attained in treatment of any disease should be its prompt and permanent cure. At

present, this ideal undoubtedly has been attained in a considerable percentage of cases of peptic ulcer but it is also true of the majority of these patients that more or less regulation of their habits of living is necessary. This commits many of these patients to a routine which is sufficiently different from the habits of people in normal health that there is the constant temptation to return to normal habits of living with the consequent danger of bringing about recurrence of the disease. The ideal treatment of a disease of the character of ulcer, then, would be that which would enable the patient to follow more or less normal habits of living.

With the present incomplete knowledge of the cause of ulcer, and considering the relative importance of the many factors which are believed to contribute to the production of ulcer in the individual case, it apparently is necessary continuously to maintain those conditions which will in turn control these causative factors. It is in this respect that surgical operation offers so much to the patient who has ulcer, for there are various types of operations which, in the great majority of instances, are sufficient to maintain such satisfactory control of enough of the major factors involved in the cause of ulcer that other uncontrolled factors are not sufficient to bring about recurrence of the disease. On the other hand, recurrence does occasionally take place after surgical management, because the particular procedure performed did not sufficiently eliminate some of these major factors. If the surgical treatment of ulcer could progress to a point at which it could be more definitely known in the individual case just how far it was necessary to go in controlling these major factors, it would do much to solve the problem of treatment. For example, if it were possible as soon as a diagnosis of peptic ulcer is made to institute some form of surgical management which would routinely have a lower operative risk than the ultimate risk of the disease, and if such surgical management should establish such modification in gastric function that absolute protection would be given against recurrence of ulceration, it would be a great contribution to medicine because of the great frequency of ulcer and the enormous economic loss imposed by the recurrent nature of the disease and by the complications with which ulcer is associated. I believe that very definite advances have been made to-

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ward this ideal, chiefly in respect to recognizing those cases in which the condition is going to be resistant to medical management. In this group of cases, when surgical management is carried out the patient is spared much time, expense and suffering.

The problem, therefore, of the surgical management of ulcer is the same as that of the medical management; it is largely one of prevention of recurrence of the disease. The cure of any ulcer by surgical management is a relatively simple matter in principle. Almost any procedure which will relieve intragastric tension, thereby obviating hypermotility and hypersecretion, is sufficient to bring about healing of the lesion. Restoration of physiologic function, which is a very important factor to take into consideration in all operations which are on a physiologic basis, always must be considered in the type of operation which is carried out. For this reason, those operations which involve the innervation of the stomach through the vagus nerves have been abandoned because it has been shown, both experimentally and clinically, that any immediate effect in respect to reduction of acid is more than counterbalanced not only by the return to acid values that were present before the vagus nerves were interrupted but also by other results, particularly hypomotility, which may give rise to a group of symptoms which are more disabling than those originally associated with the ulcer. Therefore, since surgical management is based almost entirely on indirect effects and because of the ease with which the lesion for which the patient was operated on can be healed, an understanding of the effect of different types of operations in maintaining permanently those conditions which will prevent recurrence is most important.

Experience has shown that in the surgical management of peptic ulcer a direct attack on the lesion is insufficient and some indirect surgical procedure must be done to give the patient the highest degree of protection against recurrence of the disease. The effect of these indirect procedures is modification of gastric function, particularly lessening the activity of the secretory and motor mechanism. If this is true, the best type of operation for ulcer should be that which would provide the greatest modification of such function. It may be argued, however, that the ideal operation would be that which would

modify function and maintain this state of affairs just enough to prevent recurrence of the disease, since it has been shown clinically that when such changes in gastric function are carried to extremes another train of symptoms may be produced which may be just as disabling as the symptoms of ulcer. Since it is true that the cure of any given ulcer by surgical means is relatively easy to bring about, the chief problem with which the surgeon has to deal is that of maintaining some treatment of the ulcer, by surgical means, which will prevent recurrence.

The general plan of the operations which are performed with this in mind vary in the effect which they have on gastric function and on the prevention of recurrence; the extremes in these effects are represented, on the one hand, by operations on the pylorus and, on the other, by extensive gastric resection. With the former type of operation, end-results are satisfactory in a smaller percentage of cases than in perhaps any other type of operation used in the treatment of ulcer. The fault, however, probably is not in the operation itself but in the fact that various types of reconstruction of the pylorus of the stomach are attempted in cases in which they should not be applied. A careful review of a series of cases sufficiently large to be of some value as a study will show that, regardless of the situation of the lesion, if reconstruction of the outlet of the stomach is performed so that it accomplishes two purposes, namely, permanent ablation of the pyloric muscle and at the same time construction of a pyloric outlet as large, for instance, as that effected by gastro-enterostomy, the result will be excellent, not only in relief of symptoms but in protecting the patient against further ulceration. It is only when such an opening can be constructed that operations on the outlet of the stomach should be considered. At the other extreme, lies extensive resection for ulcer; there is no operation which is more satisfactory, but again it should be applied only when clearly indicated. In cases of large gastric ulcer it is the operation of choice when it can be carried out reasonably safely, but for duodenal ulcer it would seem to be more sound to attempt to apply the more conservative methods according to the type of lesion which is present.

Experience has shown that when a conservative method has been carefully selected the re-

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sult would be difficult to improve on by any other procedure. Although it has been suggested that one of the very late results of partial gastrectomy for duodenal ulcer would be great hyperactivity of gastric function, such results are not as yet known. There are no large series of cases in which a sufficiently long time has elapsed after the operation to make of value a comparison with the known late results of conservative operations. Between these two extremes of surgical procedure for peptic ulcer, gastro-enterostomy finds a most useful place and the principles on which long experience has founded the operation are: an adequate reason for operation, conditions suitable for gastro-enterostomy, making of an opening sufficiently large and reasonable attention to habits of living following the operation.

In the event of recurrence after any of these operations, namely, reconstruction of the outlet of the stomach, gastro-enterostomy or partial gastrectomy, recurrence of the original condition should be treated in the same way as that in which a primary lesion is treated; that is, every effort should be made to cause the lesion to heal and to remain healed and, if this is not possible, further operation should be carried out. Then it should be recognized that the patient has demonstrated a particular liability to recurrence of the disease and the most valuable procedure becomes justified. The same general principles of treatment can be applied by the surgeon as by the clinician and it is through the application of these principles that the best results of surgical management will be obtained.

### Medical Question Court on Ulcer Symposium

CHAIRMAN O'BRIEN: We have twelve questions here which have been submitted for answer by the men who have taken part in the symposium. I am going to ask each man to limit his reply to two minutes.

The first question is for Dr. Mann:

*"How do you account for the seasonal occurrence of symptoms in duodenal ulcers? In all discussions on the cause of ulcer I have never heard this explained."*

DR. F. C. MANN, Rochester, Minn.: I feel like answering this question in the same manner as the high school boy who was asked to explain Einstein's theory—"Ask me an easy one." It is obvious that we do not have any accurate answer to the question, at least I do not. The problem divides itself into two parts: first, whether there is an actual flare-up of the organic lesion, and actual tissue changes in the ulcer; and, second, whether it is simply an accentuation of the symptoms. The answer to the latter probably also bears some relationship to whether or not we have a seasonal variation in the threshold of reception in the central nervous system and it becomes a problem of the central nervous system.

Then the former is also divided into two parts: first, whether the seasonal variation causes a change in the physical and environmental stress, which we know does affect the coördinated mechanism of the gastro-intestinal tract of which I spoke. In the second part we have the variation in diet and that also can be divided into two parts: namely, whether there is adequacy or inadequacy of the vitamins, and, second, whether there are changes in the reaction of the ingested food.

I feel that we can answer this question when we can answer the question of why the human being at this season of the year takes his market basket on his arm or a knife in his hand and goes down the byways and the pathways and cuts greens.

\*Held at the annual meeting of the Minnesota State Medical Association, Saint Paul, Minnesota, May 3, 1937.

CHAIRMAN O'BRIEN: The next question is for Dr. Eusterman:

*"Certain patients with ulcers seem to be cured by advertised stomach powders. How do you explain this?"*

DR. G. B. EUSTERMAN, Rochester, Minn.: Well, if you accept the claims of manufacturers you want to take them for what they are worth. In recent years there has been a very popular tablet made here in the Twin Cities. In this particular tablet sodium is eliminated and bismuth substituted, or the sodium is at least reduced.

Of course, all of these tablets probably are no more effective than tablets dispensed by physicians and I think the reported cures are more apparent than real.

I want to add that I have observed twelve cases in which the gastric lesion probably started as an ulcer or early cancer but when I first saw the patients they had inoperable cancer. They had taken these proprietary tablets for an average of two years. If the patients had gone promptly to their physicians some of them would probably still be alive.

I doubt the efficiency of any commercial tablets over the tablets that are prescribed by any reputable physician, but I do think that the combination or proportion of the ingredients of some of these tablets has been improved over the old, ordinary run of tablets formerly given to patients.

CHAIRMAN O'BRIEN: The next question is for Dr. Morse:

*"How certain can one be from the x-ray examination as to whether an ulcer is benign or malignant?"*

DR. R. W. MORSE, Minneapolis: In the great majority of cases I think one can be quite certain because the gross pathologic changes of cancer and ulcer are entirely different. In ulcer we have a loss of substance with the surrounding area of inflammation which was developed because of insults which led to the loss of substance. We have a crater which is centric to the

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area of induration. In cancer we have an irregular or regular tumor in which ulceration can occur at any point and the ulcer may be of any size. The crater is usually irregular and is usually not centric to the area of induration. We do get cases of carcinoma in which we have the typical appearance of benign ulcer. Fortunately these are very rare and do not, I think, constitute over 1 or 2 per cent of all cases.

In a malignant tumor we have an intrusion into the lumen of the stomach, whereas with a benign ulcer we have a crater protruding from the lumen of the stomach. If we will take a little more time and follow the healing we will get more help. An ulcer which is progressively diminishing in size should be benign. If it heals partially and then refuses to heal any further, it should be considered malignant.

CHAIRMAN O'BRIEN: This question is for Dr. Balfour:

*"I have a patient with a chronic gastric ulcer who has been to a surgeon who has recommended gastro-enterostomy. The patient fears a jejunal ulcer if he has it done, as one of his friends had one. What assurance can I give him?"*

DR. D. C. BALFOUR, Rochester, Minn.: I think one can very promptly assure this physician that the danger of a jejunal ulcer after gastro-enterostomy for gastric ulcer is practically nil. I am not able to give an explanation as to why jejunal ulcer is practically never seen when gastro-enterostomy is done for gastric ulcer or for any lesion in the stomach, and why it is practically confined to gastro-enterostomy for lesions in the duodenum. The most likely explanation, of course, is that in cases of gastric ulcer the gastric acidity is consistently on a lower level than it is in those of duodenal ulcer. Although the acid is still present in cases of gastric ulcer, as far as fear of a jejunal ulcer following gastro-enterostomy is concerned, it can be practically dismissed.

CHAIRMAN O'BRIEN: The next question is for Dr. Mann. He seems to be getting the hard ones:

*"Is it possible for an ulcer to develop in a patient without acid in the stomach?"*

DR. F. C. MANN, Rochester, Minn.: A few years ago Dr. Palmer investigated this question by a review of the literature and a study of his own cases and he concluded that ulcer does not develop in the stomach without the presence of acid. The data on the experimental side are very positive, and an experimentally produced ulcer has never occurred in the mucosa of the gastro-intestinal tract in the absence of a content that was not acid. In other words, no ulcer has ever been produced without the presence of acid.

CHAIRMAN O'BRIEN: The next question is for Dr. Eusterman:

*"I know that rest is important in the treatment of ulcers. How can one advise a patient who has to work and support his family to take rest?"*

DR. G. B. EUSTERMAN, Rochester, Minn.: I think that noon rest is quite possible for all of us if we make the effort. I know that I have always been able to have a patient arrange his affairs so that he could stay away from work from 12 to 1 or 1:30 and sometimes to 2 P.M., until the probation period of the healing treatment was over. Noon rest, which is a break in occupational or professional stress, is important. Some of the most distinguished members of the medical profession advocate that all of their pa-

tients who are past forty-five or fifty years of age take a twenty-minute nap at noon. That is not only valuable for patients who have peptic ulcer but also helpful in forestalling degenerative lesions of all kinds.

Another important thing is the matter of week-end rest. Some of us make our week-ends as well as our vacations so strenuous that they do us more harm than good. I know I have been guilty of that. Week-end rests, instead of consisting of playing a lot of golf or going on long hunting or fishing trips with their late hours and other indiscretions, should often include a good deal of time spent in bed. Women do that naturally; they don't need to be told, as a rule, but men do not follow this custom. That is one reason why the problem of ulcer healing is so much greater in men than in women.

CHAIRMAN O'BRIEN: A question for Dr. Morse:

*"Can you tell from the x-ray if healing is taking place?"*

DR. R. W. MORSE, Minneapolis, Minn.: There are two ways you can tell from the x-ray examination whether healing is taking place. One is by observing the shape and character of the crater of the ulcer, and the second is by noting a diminution in the size of the crater.

This is a good opportunity to stress one point regarding x-ray examination of these conditions. Once the examination is made, it is old history and any question that comes up in the future in regard to what is taking place cannot be answered by the previous x-ray examination.

CHAIRMAN O'BRIEN: A question for Dr. Balfour:

*"Should patients with bleeding ulcers be given a transfusion? I believe it makes them worse by raising the blood pressure. What do you think is the best treatment?"*

DR. D. C. BALFOUR, Rochester, Minn.: I think that is a perfectly reasonable question because, as you know, there has been a good deal of debate about whether transfusion can raise the pressure enough so that you fail in the very thing you are trying to accomplish, and that is to stop the bleeding. I think the general impression is, however, that this danger is much overrated. I suppose one can simplify the answer by saying that there are times when you have to give a transfusion to save the life of the patient, and then I think one doesn't need to worry about any theories as to whether it may interfere with clotting. So I believe the danger is not very real, and I presume that many more lives have been saved by transfusion in cases of bleeding ulcer than have ever been lost by the injudicious use of it.

CHAIRMAN O'BRIEN: This question is for Dr. Mann:

*"Foci infections were once thought to be a very important factor in the development of peptic ulcer. Are they still considered a cause?"*

DR. F. C. MANN, Rochester, Minn.: I am afraid I would flunk if I met this question on an examination. However, I should like to make four statements. First, that a focal infection, if it is a real infection, is a bad thing under almost any condition, and certainly it would be bad imbalance of the physiologic mechanism of the gastro-intestinal tract; second, while we talk of the mechanism of the production of ulcer, the actual initial cause is still unknown and there may be many causes—bacteria may be one of them; third, the ulcers which we have been studying are not caused by bacteria, although they are usually secondarily infected; and fourth, the induration, and so forth, of these ulcers

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that we have been studying I believe are mainly due to infection from bacteria.

CHAIRMAN O'BRIEN: Dr. Eusterman:

"Is typhoid vaccine intravenously of any real value in the treatment of ulcers?"

DR. G. B. EUSTERMAN, Rochester, Minn.: Of course, the principle of typhoid vaccine treatment is like that of any shock or protein therapy. We have used typhoid vaccine in cases of arthritis, but I don't think we have ever used it in cases of ulcer. I use vaccine made from organisms isolated from teeth and tonsils and prostate glands in the treatment of ulcer, as subsidiary to other methods. This whole matter of vaccine therapy is on the same basis as protein therapy. Various proteins are used. Those who are proponents of foci of infection as the important etiologic factor think that any vaccine, or even a foreign protein, may produce relief. The idea is that it builds up resistance, increases the defensive area about the ulcer, reduces acidity and spasm, improves local circulation, and therefore promotes healing.

CHAIRMAN O'BRIEN: Here is one more for Dr. Eusterman:

"Do you allow ulcer patients during their post-medical care to have coffee, alcohol or tobacco?"

DR. EUSTERMAN: We annually see from 1,500 to 2,000 patients who have ulcers. The greatest number of these patients are men and the majority of the ulcers are in the duodenum. Uncomplicated gastric ulcers heal very readily; duodenal ulcers heal with difficulty. I don't think there is anything so easy to heal as an early gastric ulcer, and the greatest problem in the management of the men, in contrast to the women, is the problem of their personal habits. I think Dr. Balfour agrees with me that the greatest deterrents to cure are tobacco, alcohol, emotional and nervous and physical stress, and indiscreet habits of eating; the chief offenders are tobacco and alcohol. We, as physicians, are not helped any by all of these glamorous and misleading cigarette advertisements that we see in all of the newspapers and magazines.

Some patients are more sensitive to tobacco and alcohol than others, and patients who want to get well had better abstain from them. Patients who have always smoked heavily will never smoke reasonably for any length of time. They absolutely should not use tobacco. Some of the most distinguished gastro-enterologists make patients sign a statement that the latter are going to discontinue the use of tobacco for a specified period, and unless the patients do that the gastro-enterologists will not accept them as patients. So you see, these men in authority feel rather keenly about the abuse of tobacco.

The caffeine in coffee, like alcohol, is a distinct secretagogue. It is often used in the place of histamine in gastric examinations. Coffee and alcohol and tobacco are inimical to the healing of ulcer. Once the ulcer is healed, of course, some patients remain well in spite of going back to the use of these substances.

I also feel that patients who have old, chronic ulcers can have more leeway after operation than those who have not been treated medically. The patients who get results cooperate with us in this respect, and they may after a while go back to a restricted use of all of these things without any great harm.

Decaffeinated coffee is often permissible. I often allow, even during the period of treatment, decaffeinated coffee, well diluted with milk. One can get denicotinized tobacco; not all but a good deal or most of the nicotine, about 96 per cent, I have been told, has been taken

out. As you know, the *Journal of the American Medical Association* contains advertisements of medical cigarette holders and pipes, which have filters that are said to take out a great deal of the toxic properties of tobacco besides the nicotine. In these ways you can help the patient who has ulcer but you will find that he must be watched because a man who has once used these things excessively as a rule will never use them in moderation any great length of time.

CHAIRMAN O'BRIEN: Dr. Morse:

"In a patient with signs of acute ulcer of few days duration, I have often not been able to demonstrate the ulcer (if one is present). Have you suggestions to make?"

DR. R. W. MORSE, Minneapolis, Minn.: The first thing to admit, of course, is that the examination was adequate. Even so, ulcer symptoms with an ulcer being present can occur without being able to find the ulcer on x-ray examination. One possibility which I covered earlier in the talk is that at the time the x-ray examination was made, the insult was present but the hole had not formed. A second possibility is that many ulcers are so small that we do not see them either on fluoroscopic examination or on x-ray films made in the correct manner of the stomach and duodenum. You see this particularly in cases in which there has been hemorrhage from minute ulcer of the duodenum without deformity of the duodenum that would show on x-ray examination. A second x-ray examination several weeks later may show small scar tissue deformities characteristic of ulceration. A third possibility is that one is dealing with symptoms of some other condition; I mean other conditions which simulate ulcer without an ulcer actually being present. The two most frequent are gastritis and functional disturbance of muscle contraction. I think that upsets of muscle motor function in both the stomach and in the large bowel can sometimes simulate very closely the clinical picture of ulcer.

CHAIRMAN O'BRIEN: The last question is for Dr. Balfour:

"When is surgical interference indicated in a chronic gastric ulcer because of possible development of malignancy?"

DR. D. C. BALFOUR, Rochester, Minn.: I think that question rather answers itself from what remarks have been made here today about gastric ulcer, that is, that the only safe advice that you can give a patient with a gastric ulcer which is not healing is that the ulcer should be removed. Of course, one can find exceptions to following out that principle. Two occur to me at the moment, and the first is that although the small gastric ulcer may be malignant, it is very rarely so. As Dr. Eusterman pointed out, it is the large lesion which is likely to be found to be malignant. You can find ulcers of not more than 0.5 cm. in diameter with definite evidence of malignancy, but they are so rare that the risk of routinely dealing with them by operation may be greater than the risk of their being malignant. The second exception, of course, is a very general one, and that is where the patient's condition is such that operation is of too great a risk.

So I think the answer to the question, "When is operation indicated for chronic gastric ulcer because of possible development of malignancy?" is that there is not sufficient danger of malignancy in the cases of very small lesions to recommend operation on that basis and, if the lesion is large, that it is inadvisable to wait for evidences of its being malignant, but one must assume that it may be and advise the patient to have the lesion removed.

## SHALL WE REDUCE OUR PNEUMONIA DEATHS?\*

LUCY S. HEATHMAN, Ph.D., M.D., O. McDANIEL, M.D., and A. J. CHESLEY, M.D.

Minneapolis, Minnesota

PNEUMOCOCCUS typing and therapeutic serum distribution was begun by the Division of Preventable Diseases, Minnesota Department of Health,\*\* the past January, and although data collected are not sufficient from which to derive scientific conclusions, it is believed that physicians of Minnesota will be interested in a progress report. The work does demonstrate the feasibility of pneumonia control work by a Health Department in a State such as Minnesota, where the population is mostly rural in distribution, and where the practicing physicians must depend largely on centrally located laboratories. It has been gratifying to find how enthusiastically the physicians of the State have responded to this service and how well they have coöperated in supplying data requested by this Division. Although the beginning is small it is believed it bids fair for an effective reduction in pneumonia mortality which stands in the fourth place as the cause of death in Minnesota. It is realized that attainment of this end will take years.

From the beginning, typing has been done in the Division Laboratories for the thirty-two different types, I-XXXII, as it is only in gathering complete clinical, epidemiological and laboratory data that the necessary knowledge of pneumonia could be obtained. The importance of complete data is becoming more evident each year as knowledge of this disease grows. A number of comprehensive studies covering several thousand cases respectively have been recently published. Much information is to be gained and the full significance of all data collected is not yet entirely clear. However, it is evident that, in order to gather full information, pneumonia must be considered from the standpoint of bacteriological etiology as well as clinical symptoms and anatomical location. It has been

shown by Sutliff and Finland<sup>6</sup> in adults, Bullock<sup>2</sup> in adults and children, and Nemir<sup>5</sup> in children, that pneumonia should be classified according to the specific bacterial etiology as well as to anatomical site. Sutliff and Finland<sup>6</sup> reported in 1933 that in a series of 1,561 hospital cases, pneumococci were isolated and typed in 1,094. Typing was done for Types I through XX. Because pneumococci classified under Group IV are found in many so-called normal mouths the attempt was made to isolate these organisms from blood or directly from the lesion during life, or at autopsy. As a rule the same organism was found in the blood or lung as in the sputum. If two organisms were present, one being Type I, the latter was most commonly found in the blood or lesion although mixed infections rarely occurred. Types I, II, III, V, VII and VIII were recovered from 81 per cent of pneumococcus pneumonias and the remaining types from 19.5 per cent. It was difficult to sharply differentiate lobar and bronchial pneumonia clinically but this was done at autopsy in quite a number of cases. In 97 per cent lobar pneumonias, pneumococci were recovered with I, II, III, VIII, V and VII, in order of frequency, totaling 84.1 per cent of the typed cases. In bronchial pneumonia, typed pneumococci constituted 65.1 per cent, the order of frequency being III, VIII, XVIII, X, V, VII, XX, II, XI, XIV; and untyped pneumococci 16 per cent.

Finland<sup>8</sup> in 1937 reviewed 3,682 cases which occurred in a seven year period at the Boston City Hospital in which pneumococci were grown in culture. It is of interest that there was a sharp increase in the number of cases of II, V, and VII during 1935 and 1936, and the mortality also varied with the season. The most frequent types found in lobar pneumonia were I, II, III, V, VIII and VII, in order of frequency, making 79 per cent in all. All cases of patchy consolidation were called atypical rather than broncho-pneumonia and constituted about one-fifth of all cases of pneumococcus pneu-

\*From the Minnesota Department of Health.

\*\*Pneumococcus typing and serum distribution is also carried on by the St. Louis County and Duluth Branch Laboratory, 228 New Jersey Building, Duluth, by Rural Health District No. 1, City Hall, Bemidji, and Rural Health District No. 2, Court House, Mankato, as well as by the Laboratories of the Division of Preventable Diseases, Minnesota Department of Health.

monia. The most frequent types were III, VIII, X, XX, XVIII and VII, accounting for one-half of these cases. Most of the material from children was obtained from pleural exudate or from autopsy material. Type I was found in 50 per cent and V, XIV, II, VI, and III next in frequency, totaling 82 per cent of cases. In 764 fatal cases typed at autopsy the order of frequency was the same as above for lobar pneumonia. In the autopsied cases of atypical pneumonia, Types I and V ranked high in frequency. The peak incidence of lobar pneumonias was reached in the fourth and fifth decades, and that of atypical pneumonias in sixth decade. Fatal purulent infections without pneumonia were caused by Type III in more than one-half the cases.

Bullowa<sup>2</sup> in 1937 reviewed 4,048 endemic pneumococcus infections in children and adults in Harlem Hospital. In adults, Types I, II, III, IV, V and VII, each, constituted more than 5 per cent, Type I leading with 23.7 per cent; all totaled to 64.4 per cent. In children, XIV, I, VI, XIX, V, IV and III were the types more often found, XIV leading with 17.5 per cent of cases and I second, with 16 per cent. In adults Types II, III, XV and in children XIII, XXVIII, XXIII and XV were the most fatal.

Non-pneumococcal infections of the upper respiratory tract of adults and children were also studied. In adults Types III, VI and VIII predominated, while in such infections in children Types VI, XIV and XIX predominated.

Nemir<sup>3</sup> in 1936 reviewed 1,033 pneumonias in children ranging in age from two weeks to thirteen years in which pneumococci alone were found in 796. Repeated pharyngeal swabs were taken on those showing III, VI or XIX or any other common mouth types. Most frequent types found were XIV, I and VI, constituting 42 per cent. Type XIV was the commonest cause of pneumonia under two years, and I in the older child. These types occurred infrequently without pneumonia. Type VI and XIX were found almost exclusively in pneumonia in children under two years and both were also frequently found without pneumonia in older children. It is noteworthy that 93 per cent showing I, XIV, VII and V had lobar pneumonia, while Types III, VI and XIX were almost as common in broncho-pneumonia. Approximately

two-thirds of the patients with broncho-pneumonia showed associated streptococci or staphylococci or types of pneumococci found in carriers, as III, VI and XIX. In 425 patients studied with tonsillitis or sinusitis, Types VI and IX were the commonest invaders. The author is in doubt as to the significance of the higher types found in broncho-pneumonia.

### Serum Therapy

Recent reports show a marked reduction in mortality in use of serum therapy in Types IV, V, VII, VIII and XIV, although series of cases collected recently are not large. Since our previous summarization of results (MINNESOTA MEDICINE, January, 1937), Bullowa<sup>1</sup> has reported that of eighty-six cases of Type XIV pneumonia, there were twelve deaths or 19 per cent in sixty-three untreated cases, and two deaths or 8.6 per cent in twenty-three treated with specific serum. There have been further publications on the use of therapeutic serums in Types V, VII and VIII but it is difficult to determine whether or not there may have been some overlapping with former publications. The response to serum is encouraging since these types make up the largest incidence found in pneumonia other than Types I, II and III. One of the most encouraging advances recently in serum therapy is the development of anti-rabbit therapeutic serum. Horsfall and Goodner<sup>4</sup> recently reported on a small series of cases treated in the Hospital of the Rockefeller Institute. Of twenty-two patients treated, ten with Type I infection, four with Type II, three with Type VII, five with Type VIII, twenty-one recovered and one died with rupture of the aorta five weeks later. Of the twenty-two, twelve had a bacteremia and three infected pleural exudate. In two of the pleural exudate cases the pneumococcus disappeared from the pleural effusion after serum therapy, and empyema did not develop. After treatment rabbit serum antibodies were demonstrated in the effusion. These results suggest that rabbit antibody penetrates the pleural cavity and thus is able to attack infected pleural effusions. This has never been proven for horse serum antibody. The reason suggested is that rabbit antibody has a smaller molecule. The authors claim less immediate reaction and less serum sickness after the use of anti-rabbit serum

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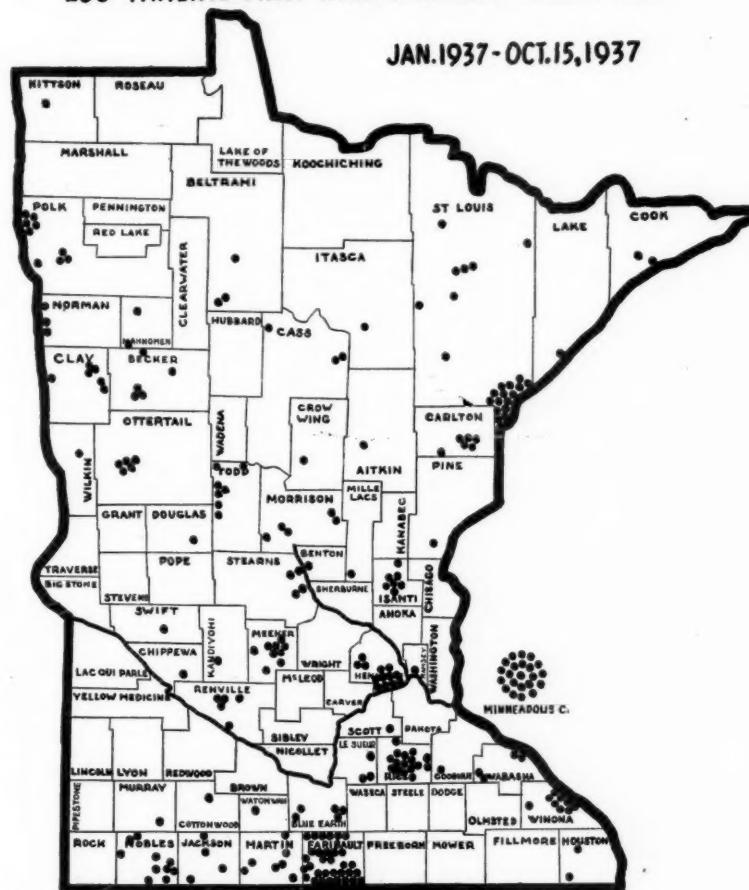
PNEUMONIA—HEATHMAN, McDANIEL AND CHESLEY

than horse serum, after the chill-producing properties of rabbit serum had been removed. It is known that rabbit serum is quite often toxic for human beings but it is now reported that these

that produced in rabbits. Preliminary reports would suggest that it may be possible to give therapeutic serum required for treatment in one dose of concentrated rabbit serum. Anti-rabbit

**MINNESOTA DEPARTMENT OF HEALTH - DIVISION OF PREVENTABLE DISEASES  
256 PATIENTS FROM WHOM SPECIMENS WERE TYPED**

JAN. 1937 - OCT. 15, 1937



Map 1.

properties have been removed by refinement. Anti-rabbit serum can be produced in smaller amounts in a shorter time for use in pneumonia due to the various types, as almost all rabbits apparently produce potent antisera in a few weeks. This is of especial importance in relation to the higher types, since immunization of horses is much more uncertain for the higher types of pneumococci and six months to two years is required to produce potent antisera. The serum in horses is not of as high a potency as a rule as

therapeutic serum for all thirty-two types of pneumococci, including Type III, will soon be on the market,\* although the amounts of some of these will be limited.

**Report on Present Work**

From January 20 through October 14, 1937, 432 specimens have been received for pneumococcus typing at the Division Laboratories. Of

\*According to a recent statement from one of the commercial houses, therapeutic serum for the thirty-two types of pneumococci will be on the market January 1, 1938.

## PNEUMONIA—HEATHMAN, McDANIEL AND CHESLEY

the above specimens 144 were largely pharyngeal swabs taken from babies with upper respiratory infections and from their contacts at a local home and will not be further analyzed. Of the 288 remaining specimens from 256 patients, 182 representing 166 cases were successfully typed. Map I shows the distribution of the patients from whom these specimens were received. Of the 182 specimens there were 140 in which the direct Neufeld typing was successful and 167 in which mouse typing was successful. The failure of the Neufeld was due to inadequacy of original specimen, either sputum or material on throat swabs. In a few instances more than one type was found. Three of these were types for which serum was available. One showed I and VII, in the Neufeld and Type I was recovered from the mouse. Type I serum was given on the fifth day but the patient died. In the second specimen, the Neufeld was unsuccessful and I and VIII were recovered from the mouse. Type I serum was given with marked benefit and the patient recovered. In the third instance, the Neufeld was unsuccessful and I, III and XIX were recovered from the mouse. The patient recovered without serum. Types represented by the 182 specimens are shown in Table I.

Of the above 166 cases, 95 fell into Groups I, II, V, VII and VIII for which serum was available. Serum was distributed as shown in Table II by the Division for use in these patients.

It is obvious that no conclusions as to the benefits of serum therapy can be drawn from such a small group. There were nine deaths in a group of sixty-seven patients receiving serum, giving a fatality rate of 13.2 per cent. In the large majority of the patients receiving serum the physicians reported marked or dramatic improvement when serum was given within the first four days. In each case reasons for death were given by the attending physician such as meningitis, extreme age, or serum was administered

TABLE I. SUCCESSFULLY TYPED SPECIMENS

Type	Number of Specimens	Cases Represented
I	53	51
II	18	17
III	16	15
IV	9	7
V	12	10
VI	2	2
VII	10	8
VIII	9	9
IX	5	4
X	1	1
XII	5	5
XV	4	4
XVI	4	4
XVII	6	5
XVIII	9	7
XIX	3	3
XX	2	2
XXIII	1	1
XXVII	1	1
XXIX	9	8
XXXI	2	1
XXXII	1	1
	182	166 cases

too late in the disease to be of benefit. Of the patients receiving serum twelve, or 18.6 per cent, developed typical serum sickness six to ten days after first injection. Seven (10 per cent) showed immediate serum reactions, and six (9 per cent) developed mild reactions one-half hour to several hours later. In one patient known to be sensitive to horse serum, treatment was discontinued after one dose. In no other instance was the serum sickness reported to be alarming.

It is of interest that, of patients hospitalized and those who remained at home, the ones who were treated at home appeared to get along better. However, when figures are analyzed it is seen that the ones with complications were those taken to the hospital.

There were eight specimens of spinal fluid from patients with meningitis of which two showed Type III and the others Types IV, VI, VII, XII, XVII and XIX respectively. Three of these persons had otitis media previous to meningitis.

TABLE II

Type	Number of Patients	Serum Used	Number of Deaths and Fatality Rate	
			After Serum	No Serum
I	51	39	4 (10.2%)	2 (16.6%)
II	17	14	0 ( 0 )	1 (33 %)
V	10	5	0 ( 0 )	0 ( 0 )
VII	18	5	*3 (60 %)	0 ( 0 )
VIII	9	4	0 ( 0 )	0 ( 0 )
Total	95	67		

\*One patient died of meningitis.

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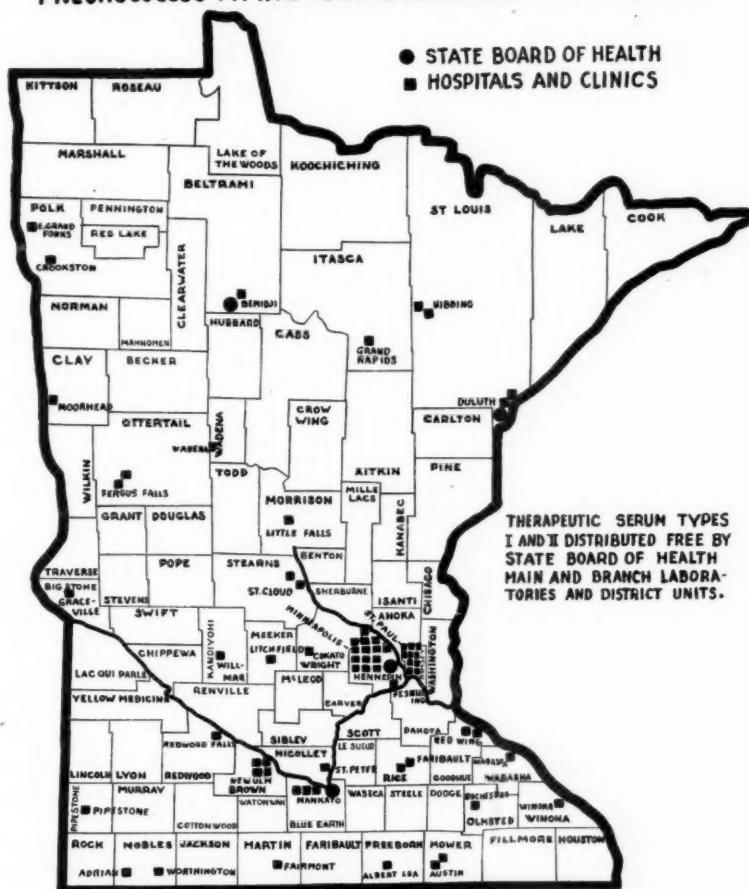
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PNEUMONIA—HEATHMAN, McDANIEL AND CHESLEY

Of the 106 specimens from ninety patients in which typing was unsuccessful, data were obtained from the physician in only sixty cases (eighty-three specimens). Analysis of the data available

tubercle bacilli. This was more or less experimental to ascertain whether one might find new tuberculous infections in this way. Of 169 specimens of sputum, four showed the presence

**MINNESOTA DEPARTMENT OF HEALTH-DIVISION OF PREVENTABLE DISEASES  
PNEUMOCOCCUS TYPING SERVICE AVAILABLE IN MINNESOTA**



Map 2.

yielded the following information: twenty-seven were probably lobar pneumonia, eleven bronchopneumonia or hypostatic pneumonia, seven active pulmonary tuberculosis, two pneumococcus meningitis, three asthma and ten were termed definitely "not pneumonia."

#### Demonstration of Tubercl Bacilli

On all sputum specimens where sufficient material was received a routine microscopic examination was carried out for demonstration of

tubercl bacilli. Three were from patients who had not been previously diagnosed. One of these three patients also showed Type I pneumococcus in the sputum, and apparently had typical lobar pneumonia. In addition tubercle bacilli were found in sputum from one patient who had been previously reported as having tuberculosis.

#### Analysis of Data as to Time Element

It has not been possible because of lack of information to analyze all specimens typed as to

the time which elapsed between the hour of collection and that of administration of the serum. Sufficient data are available to indicate that it is feasible for a physician in rural Minnesota to use the pneumonia service. For example: in specimens from ninety-six patients there was an average of forty hours and twenty minutes from hour of first symptoms to the hour the specimen was collected. In specimens from eighty-four patients there was an average of fifty-eight hours from the time of first symptoms until the hour type was reported by this Division to the physician. In specimens from seventy-six patients there was an average of sixty-nine hours from the time of first symptoms until the first dose of serum was given, i.e., under three days from time of first symptoms. Distance to some points was as great as 225 miles and the average was 125 miles. The above takes into consideration specimens received in the Main Laboratories. Actually this time has been considerably less in sections of the state tributary to our Branch Laboratory in Duluth and Rural Health District No. 1, Bemidji, and No. 2, Mankato.

#### Comment

From the above it is apparent that our knowledge pertaining to pneumonias is being changed. As it were, only yesterday we thought of the pneumococcus being truly significant in lobar pneumonias alone. The recent studies in pneumococcus typing have shown that the pneumococcus may be responsible for varying percentages of atypical or broncho-pneumonias and that the various types of pneumococci may have greater significance now and again, according to age, geographical distribution and season. Much continued, thoroughgoing study is necessary before the full significance of these multiple types of organisms can be finally evaluated. It

is only through the submission of specimens for type determination from all varieties of pneumonias that the facilities so recently brought to hand through scientific study can be utilized to the fullest degree. With this in mind it is urged that local laboratories as far as possible attempt the typing of pneumococci. It may be noted from Map 2 that a number of local hospitals and clinics are now carrying on typing. The Division of Preventable Diseases will continue to aid them, sending a trained bacteriologist to demonstrate typing procedures to laboratory technicians and to groups of physicians who are desirous of becoming familiar with this work. When it is realized that there are approximately 2,500 deaths from pneumonias of all kinds in Minnesota each year it is logical that the State Department of Health should exert every effort to aid the physicians in the reduction of these deaths. In a previous paper the collected results of the use of serum indicate that specific type serums, if administered early, at least by the end of the fourth day, are effective in markedly lessening the deaths and in shortening the period of illness. In order to bring this about we must act promptly in securing service and using the specific type serum. This stands as a challenge to the profession and the health authorities.

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## THE DIAGNOSIS OF HYPERTHYROIDISM\*

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THE classical symptoms and signs of a typical case of hyperthyroidism are so well known to you it would not be profitable to review them. These cases usually present little trouble in diagnosis. I shall discuss, rather, the diagnosis of atypical hyperthyroidism and emphasize the importance of the recognition of hyperthyroidism because the diagnosis is often missed from failure to think of the disease. Nearly all cases of hyperthyroidism are associated with an increase of basal metabolic rate, but, obviously, if the disease is not thought of, this test is not made and the correct diagnosis is not established.

The subject of atypical hyperthyroidism has been ably presented by Dr. E. Perry McCullagh and I shall follow him closely in my presentation. He points out that one source of difficulty is that other diseases may closely simulate hyperthyroidism, such as neurocirculatory asthenia, the nervous disturbances associated with menopause, loss of weight from obscure causes, and increases of the basal metabolic rate due to other causes than hyperthyroidism. Here hyperthyroidism does not exist, but is imitated.

We shall not concern ourselves with the diseases just mentioned but rather with another group of cases in which hyperthyroidism is actually present but difficult to recognize, because: (1) the signs and symptoms of the disease may be unduly prominent in one particular system and simulate a single system disease; (2) one or more of the important signs of hyperthyroidism upon which we rely for diagnosis may be absent; (3) the disease is complicated by some other condition which so dominates the clinical picture that the underlying hyperthyroidism is masked.

We shall now discuss in greater detail these various groups and take up, first, hyperthyroidism with signs related chiefly to one system.

Here the so-called thyrocardiac with predominant cardiovascular symptoms is the most common. We usually are dealing with an individual in middle or late life. Of 145 cases of hyper-

thyroidism past the age of sixty reported by Howard M. Clute of Boston, sixty showed either auricular fibrillation or congestive heart failure. Commonly it is a woman over forty years of age who has known about the presence for many years of a nodular goiter, or perhaps has no goiter, who presents herself because of attacks of fibrillation or, rarely, flutter. Perhaps a diagnosis of mitral stenosis has been made or there may be a frank cardiac decompensation or a complicating hypertension. We find the heart enlarged somewhat to the left, an accelerated rate, in many instances an impressive overaction with a thrill at the apex, loud snapping heart tones, a forceful thrust of the apex against the palpatting finger, and a systolic murmur at the apex but no presystolic murmur indicative of mitral stenosis. The tendency to edema may be aggravated by a low serum albumin which is commonly found in hyperthyroidism. The basal metabolic rate is usually about plus 30 and a rate persistently at this level speaks strongly for hyperthyroidism as the principal cause of the cardiac disorder. The iodine response so characteristic in exophthalmic goiter is often not well marked. The present view of nearly all competent pathologists is that permanent structural change of the heart does not result from thyroid disease alone and that there is a complete restitution to normal integrity of the heart muscle after severe cardiac failure, in the event of cure. However, the term thyrocardiac expresses a useful practical clinical concept.

A less well known manifestation of hyperthyroidism, in the cardiac field, is the production of anginal attacks because the effect of the heightened metabolism and emotional reactivity is the same as the well known effect of physical exercise or emotional stress in an ordinary case of angina. The onset of hyperthyroidism then may be ushered in by anginal seizures.

The thyrocardiac constitutes, therefore, a most important group and must be thought of particularly in middle aged goiter bearing women who complain primarily of the heart. The goiter should then receive first consideration.

\*Read at the annual meeting of the Minnesota State Medical Association, Saint Paul, Minnesota, May 4, 1937.

## DIAGNOSIS OF HYPERTHYROIDISM—JOHNSON

Next in the group with single system symptoms are those with excessively predominant neuromuscular manifestations which Lahey of Boston has described under the term apathetic hyperthyroidism. Here again the patients are in the older age group. They present themselves complaining principally of marked muscular fatigue and asthenia. Their appearance is one of apathy, of fatigue and exhaustion. There is a coarse tremor and often a gradual weight loss. They lack the activation, the look of anxiety, tension, excitement, and apparent emotional stress, so characteristic of hyperthyroidism.

Further, we may have patients presenting themselves with the picture of a gross error of metabolism. Here we find patients, often past middle life, with profound weight loss as the outstanding symptom, usually beginning insidiously and often reaching astonishing levels, as, for example, an elderly man with hyperthyroidism, now under my care, with a weight loss of eighty pounds. A weight loss of forty to sixty pounds is not uncommon. The probable reason for the inordinate weight loss is a failure on the part of an older individual to compensate adequately with increased appetite and excess food intake for the hyperthyroidism. If diabetes can be excluded, with this paradoxical reaction of a persistent weight loss in spite of a fairly good intake of food, the diagnosis of hyperthyroidism becomes fairly certain.

Again, outspoken exophthalmos may precede by several months any other well defined symptom. These are exceptional cases, for, although exophthalmos may come early in the course of the disease, other features are nearly always present to corroborate the diagnosis.

Lastly, gastrointestinal disturbances may dominate the picture and we may see the patient for the first time in a gastrointestinal crisis with nausea, vomiting and diarrhea with simulation of appendicitis or cholecystitis.

The next group of cases in which there is increased liability of error includes those with one or more important signs of hyperthyroidism absent. Instead of tachycardia, for example, the pulse rate in a few cases may be normal or nearly so, especially in men past mid-life, in a stage of remission. Or the normal pulse rate may represent actually a relative tachycardia in an in-

dividual with a normal bradycardia. An illustrative case was a male patient who showed a weight loss of sixty pounds, a moderately elevated basal metabolic rate but a pulse rate never over eighty-five. When the hyperthyroidism was corrected the pulse returned to his lifelong normal rate of fifty-six so that the rate of eighty-five during the active phase of the disease represented a considerable percentage increase—a relative tachycardia.

A goiter may be absent but if the other features of the diseases are well defined the absence should not negate the diagnosis. Increased size is not obligatory as there may be only an increased consistency of the gland or one or more nodules. Before concluding that there is no goiter, one must exclude the possibility of a substernal or subclavicular extension of an adenoma. The absence of a goiter, however, should lead to caution against designating the thyroid as the cause of the symptoms.

Again, there may be no increase of basal metabolic rate in hyperthyroidism. Many competent observers have agreed that such a condition may exist, especially in women past middle life in whom a nodular goiter has long been present. The late Roger Morris insisted that, if all the other standard features of hyperthyroidism were present, one should disregard the low basal metabolic rate and establish the diagnosis notwithstanding. However, if there be no goiter combined with no increase of basal metabolic rate, the chance of such a diagnosis being correct is about one in one hundred.

Weight loss may not be present. In fact, in younger individuals, a voracious appetite may over-compensate for the increased metabolism and the weight curve may rise instead of fall.

Errors are caused in a third group of cases because the hyperthyroidism is complicated by some other condition which dominates the clinical picture. Neurocirculatory asthenia with the characteristic symptoms of nervousness, fatigability, weakness, and palpitation of the heart, causes much confusion and especially if a goiter is present.

The tell-tale badge of neurocirculatory asthenia is the cold, wet, clammy hands and feet, sometimes cyanotic, in contrast to the warm and lusty peripheral circulation of hyperthyroidism. There are also greater variability of the pulse

## SURGICAL TREATMENT OF HYPERTHYROIDISM—NORDLAND

rate and an obvious neurotic attitude. The presence of a cold, moist hand in itself practically rules out hyperthyroidism. If hyperthyroidism develops in an individual with neurocirculatory asthenia one notes a changed facial expression, a persistently high systolic blood pressure, a persistent tachycardia at rest, a vigorous heart thrust, warm hands, and an increase of basal metabolic rate above plus 20 as contrasted with a less elevated basal metabolic rate usually observed in neurocirculatory asthenia. One must be prepared, however, for disappointments from operation in this group as, when the hyperthyroidism is corrected, the substratum of neurocirculatory asthenia remains.

We have time left to mention very briefly only the psychoneurotics which Boothby has discussed so ably. Here is the individual with an inferiority complex, terribly self conscious, overly

conscious; his entire life guided by public opinion. His somatic reactions are basically those of fear with the characteristic anxiety, nervousness, tremor, tachycardia, and sweating seen in fright. To distinguish these cases from hyperthyroidism the two most important findings are the absence of weight loss in spite of an increased basal metabolic rate and the absence of an increased sense of warmth. There is no need of a hasty diagnosis in these cases and one of the best safeguards is repeated basal metabolic rate determinations. One frequently sees markedly increased metabolic rates in the earlier determinations but after the patient loses his apprehension and becomes accustomed to the test, there is a progressive decline in the rate of successive tests, to normal or subnormal levels. This is an exceedingly useful maneuver in ruling out hyperthyroidism.

## THE SURGICAL TREATMENT OF HYPERTHYROIDISM\*

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THERE is no disease and no situation in surgery where the decision for the time of the operation and the selection of the proper procedure is so dependent upon a large experience and the good judgment of the operator as in the cases of patients with severe hyperthyroidism. In other branches of surgery, including simple nodular goiter, the successful outcome of the operation is almost entirely dependent on a good technic and proper asepsis. The operative mortality in adenomatous goiter with hyperthyroidism is mainly dependent upon the condition of the heart and kidneys or the presence or absence of some other constitutional disorder. Acute hyperthyroidism affects individuals and the various age groups so differently that adherence to a meticulous technic and a good asepsis is not always sufficient to save the patient from death. Serious thyroid reactions or crises which are frequently responsible for death in these severe cases are distinctly lessened by multiple stage operations.

The majority of the patients with hyperthyroidism who present themselves for treatment, can, with proper preliminary medical preparation, be subjected to a primary subtotal thyroidectomy. Nevertheless, every surgeon who deals with cases of hyperthyroidism is familiar with the patient who, in spite of all measures to improve his condition, fails to improve or even becomes worse. This is the type of patient who, no matter how great the risk, must be subjected to some sort of procedure which may at least temporarily check the progress of the disease. In the cases of severe hyperthyroidism, the factors which make a multiple stage procedure necessary may be divided into two groups, those to be considered before the operation and those which are present at the operation.

The preoperative use of Lugol's solution is a most valuable agent in the treatment of this disease. It must be understood, however, that the beneficial results of medical treatment alone are at best but temporary and that the drug treatment should be followed within a relatively short time by proper surgical procedures. The max-

\*Read before the annual meeting of the Minnesota State Medical Association, Saint Paul, Minnesota, May 4, 1937.

## SURGICAL TREATMENT OF HYPERTHYROIDISM—NORDLAND

imal results derived from the administration of iodine are usually obtained in from ten to fourteen days, but in some cases a period of three weeks is required. A second or even a third remission may be produced with iodine but each one, after the first, is brought about with much more difficulty and is less complete than the first. According to Reinhoff, operation as soon as the first remission is established offers the best prognosis, and once this golden opportunity is allowed to slip away another such remission can be obtained only with great difficulty, if at all.

It is an accepted fact that about 5 per cent of patients with exophthalmic goiter cannot be made satisfactory surgical risks by the prolonged medical treatment. In this group a two-stage operation is clearly indicated. A preliminary ligation of one or more of the thyroid arteries as formerly done by Kocher will so improve the patient's condition that the gland can be resected later without the danger of an acute reaction. He believed that "by ligation of one artery there is an amelioration of the patient's condition. If two are ligated, the amelioration is greater. If to this we add the removal of one lobe, the amelioration is still greater. Ligation of all four vessels will very rarely suffice to cure the patient who is seriously ill with exophthalmic goiter." Therefore, in the above type of cases as well as the patients in the most extreme states of hyperthyroidism, ligation should be employed always with a view to improving the patient's condition so as to permit a subtotal thyroidectomy to be more safely performed later.

The interpretation of the basal metabolic estimation is an important factor. In recent years too much emphasis has been placed upon the value of basal metabolic observations. While the metabolic estimation is in general a quite accurate indication of the degree of thyroid toxicity, it can be extremely misleading and unreliable as a criterion of operability. Its value in the diagnosis and treatment of thyroid disturbances is most important only when the reading is extremely high. In cases with the basal metabolic rate only slightly higher than normal other diagnostic signs are of more value. One of the most positive evidences of hyperthyroidism and the most dependable in adults particularly is tachycardia. Almost as dependable is

weight loss and the least dependable evidence of intoxication is basal metabolism interpretation. A patient with a relatively high basal metabolic rate who is gaining weight is a better operative risk than a patient with a considerably lower basal metabolic rate who is losing weight. When, in spite of a good food intake, there has been a marked loss in weight and when, in spite of an attempt to increase weight during the pre-operative preparation, the patient still loses weight, preliminary pole ligation must be considered the procedure of choice.

On the operating table, in the interpretation of tachycardia in patients with hyperthyroidism, it should be remembered that there is usually a preliminary rise in pulse rate as a result of the anesthesia induction. Opinion should be delayed as to what the average pulse rate truly is until the patient is well past the stage of anesthesia induction and well under the anesthetic. We find gas (nitrous oxide or ethylene) the ideal anesthetic for patients with marked hyperthyroidism. Nervousness in the patient is thus avoided and better relaxation obtained. With the elimination of the psychic factor, we are better able to judge the condition of the patient as indicated by the pulse rate and thus determine the extent of the operation. When there is a persistent high pulse or an increase in rate of the heart beat under gas anesthesia, a multiple stage operation must be considered. Decisions for or against multiple operations may arise during the operation when any technical difficulty such as an excessive amount of bleeding occurs or when an unusual amount of time is employed in removing the first side. With any complication which renders the operation unusually difficult, it would be well to err on the side of conservatism, risking a second operation rather than the patient's life.

There is an important factor which does at times unfavorably influence decisions to perform multiple stage operations in severe cases. The surgeon realizes that he is going to put this patient through two or three stage operative procedures. He is aware of the fact that the patient and his family will be disappointed and possibly critical. He is further conscious of the fact that it involves a longer time from home and an increased expense because of the prolongation of the hospitalization. Lahey asserts

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## SURGICAL TREATMENT OF HYPERTHYROIDISM—NORDLAND

that "sentiment for the patient and a desire on the part of the surgeon to save the patient time and money have cost many a patient his life and has no place in the decision for or against multiple stage operative procedures in a patient sick enough from hyperthyroidism to have the question of multiple stage operation raised. After all, if the patient survives a pole ligation, he will survive, in practically all instances, a right subtotal thyroidectomy and then a left subtotal thyroidectomy and his living presence and improved condition will be convincing evidences that easily outweigh any arguments which may be made against the soundness of this position."

Efficient hemostasis is most important in thyroid surgery, particularly in hyperthyroidism. For better hemostasis and because of the greater safety to the recurrent laryngeal nerves and the parathyroids, we apply a ligature to the inferior thyroid arteries, extrafascially, before proceeding to the excision of the gland. We always ligate one inferior thyroid artery and both superiors in non-toxic and mildly toxic cases. We ligate all four arteries in severely toxic cases. In the surgery of severe hyperthyroidism, speed and gentle handling of tissues are important factors. Care should be taken to make a thorough removal of the gland so as to leave only a small portion in the esophago-tracheal groove. This will best prevent persistent or recurrent hyperthyroidism.

The cause of recurrent symptoms following operations for exophthalmic goiter has not been fully explained. Various theories, as well as carefully conducted studies along this line, have been reported, but as yet no satisfactory reasons have been established, why in occasional instances recurrence of hyperthyroidism takes place at various intervals following thyroidectomy. It is true that in many cases incomplete removal of the gland, such as in hemithyroid-

ectomy or in instances in which retrotracheal extensions are overlooked, accounts for the recurrence of the symptoms, yet there remains a certain definite group of patients in which minimal amounts of gland tissue are preserved and yet return of symptoms is noted.

Classification of these recurrences, therefore, can readily be made on the basis of whether the previous removal of the gland was adequate or inadequate, and of course the proper treatment in the latter type of case is prophylaxis. This consists in a thorough removal of the gland, including the isthmus and also the pyramidal lobe if present, leaving only a thin layer on the posterior capsule and taking care to locate and resect any retrotracheal extensions. This procedure will prevent most, but not all, recurrences.

The amount of gland to be left at operation obviously cannot be estimated to a very exact degree. If this were necessary, then good results from thyroidectomy would be few and far between, because the surgeon would have to possess either extremely accurate methods to judge this amount or he would have to have great intuition to know how much tissue was to be preserved. In other words, most cases of thyroidectomy would result in either postoperative myxedema or persistent hyperthyroidism unless a very definite exact amount of tissue were left behind.

It is now conceded that the most efficacious method of treatment of exophthalmic goiter is one which combines both medical and surgical measures. Alone, either will be found inadequate for the great majority of cases. They call for constant and closest coöperation between the internist and the surgeon. The consensus of opinion to date is that the greater majority of patients with hyperthyroidism should first have a period of medical treatment and later be subjected to operation.

## X-RAY TREATMENT OF EXOPHTHALMIC GOITER\*

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DIFFUSE hyperplasia of the thyroid is the reaction of the thyroid to some outside stimuli which, at the present time, have not been discovered. This may be due to a deficiency of some kind, that is, the effect of an antithyroid hormone, or may be due to an over-abundance of a thyrotropic hormone. The reasons for this conception are that the physiological manifestations of exophthalmic goiter can be produced in animals only by injecting the thyrotropic hormone of the anterior pituitary gland while those of toxic adenoma can be produced by the use of thyroid extract. Pathologically, the areas of hyperplasia and lymphocytic infiltration in exophthalmic goiter are diffuse throughout the gland while in adenoma the hyperplastic areas are circumscribed and well defined. Clinically, an exophthalmic goiter is frequently accompanied by a typical facial expression with eye stare and exophthalmos which are not present in toxic adenoma. Also there are remissions and exacerbations in exophthalmic goiter while in toxic adenomas the symptoms are progressive.

The object in all methods of treatment of exophthalmic goiter, medical, surgical, or x-ray, is the removal of the new hyperplastic tissue. In the medical treatment this is obtained by the use of Lugol's solution which causes a restorage of colloid material with the filling of the acini. This causes pressure on the small blood vessels with a resultant diminution of the blood supply to the hypertrophic tissues and a cessation of symptoms and drop in the basal rate. Surgery obtains the same ends by a subtotal thyroidectomy, that is, a surgical removal of both normal and hyperplastic thyroid tissue.

Young hyperplastic tissues and endothelial cells are extremely sensitive to roentgen rays while normal adult tissue is fairly resistant. In the x-ray treatment of exophthalmic goiter the gland is exposed to heavy doses of x-ray and the hyperplastic tissue and the endothelial cells in the rapidly developing vascular system are de-

stroyed, leaving the normal thyroid tissue practically intact.

In x-ray treatment of this disease, it was first thought that repeated small doses of x-ray would cause a cure. Now the treatment consists of giving heavy doses at close intervals, every other day, for four treatments, the total amount given in a course being between a 120 and 130 per cent skin erythema dose. After this, the patient receives no more treatments for six weeks when a second course is given, which is similar to the first. Only exceptionally a third course need be given three months following the second.

After the treatment, there is usually a drop in the basal rate to within normal limits and an amelioration of the symptoms. In some cases, the basal rate does not follow the clinical improvement, but does drop after the second course. After the second course there is apt to be a tracheitis and painful swallowing, which appears about the fifth day after the treatment; this usually responds to heat rather than cold. There is also some nausea due to the absorption of the rays. In two hundred and fifty cases there has been only one case that developed slight petechia.

A recent check up on the cases that have been treated, two to ten years after treatment, showed the following results in one hundred and eight patients who replied to a questionnaire.

Percentage of cases	Percentage recovered
55	100
1	95
6	90
2	80
14	75
22	less than 75

Recovery less than 75 per cent is considered unsatisfactory. By recovery is meant the portion of the normal amount of work and also percentage of outside activities that patients are doing, that is the per cent of their normal life that they are living.

Of the group of unsatisfactory results, five patients were operated upon. One patient being very blond was unable to receive the proper

\*Read before the annual meeting of the Minnesota State Medical Association, St. Paul, Minnesota, May 4, 1937.

## ACUTE APPENDICITIS—NORMAN

x-ray exposure on account of the skin reaction. In one case we were unable to control symptoms which, after a short remission, would all return again. Three patients were operated upon elsewhere after receiving marked benefit from the first course of treatments.

These results are approximately the same as those given by the surgical department at the University of Minnesota, in 1935.

In our series, we had no case of crisis, no mor-

tality that we could determine, no recurrent nerve injury and no parathyroid involvement.

### Conclusion

X-ray treatment of diffuse hyperplasia of the thyroid is safe, it is economical, it is accompanied by very few complications and the end results are practically the same as following thyroidectomy.

## ACUTE APPENDICITIS\*

J. F. NORMAN, M.D., F.A.C.S.

*Crookston, Minnesota*

**I**N attempting to present a paper on acute appendicitis, one is confronted with a great mass of literature on the subject, some hundreds of papers having been presented during the last five years. This alone would indicate that the subject is a live one and that the profession is not satisfied with results as they are today. There were 327 deaths from appendicitis in Minnesota in 1936. This would mean some 10,000 cases for that year. Eighteen to twenty thousand lives are lost from this cause annually in the United States.<sup>8</sup> Any disease which causes such loss and which causes a half million people serious illness deserves continued study. While most diseases have shown a decrease in mortality, that from appendicitis has shown an increase until recently. Four times as many people die from appendicitis as from cancer before the age of fifty years. Deaths from appendicitis equal all those from salpingitis, pelvic abscess, surgical diseases of the pancreas, spleen, thyroid, gall-bladder, gastric and duodenal ulcers.<sup>4</sup> The mortality rate of 17.4 per 100,000 in 1931 showed a marked increase over fifteen years ago. This increase was present in spite of a lowered mortality for early cases and better hospital care.

It would seem that the study of this condition should try to fix the responsibility for this high mortality rate. This would mean education of the public to the danger of delay in any case of pain in the abdomen, and that the taking of a cathartic for pain in the abdomen may be dan-

gerous treatment. The public should be taught to call a physician early and not after home remedies have been tried. A surprising number of these patients will state that they thought the condition could not be appendicitis because the pain was not in the right, lower abdomen. Bowers did much to lower mortality in Philadelphia by such information being given wide publicity.<sup>1</sup>

It would be well for the profession to review this subject as it has not been in agreement as to the treatment of the case of appendicitis seen late, though it is agreed that immediate operation is the only treatment for the one seen early. Bowers reports that fifty-one physicians of Philadelphia, in 1932, prescribed cathartics in the presence of acute abdominal pain followed by four deaths due to acute peritonitis from ruptured appendices. The management of the case postoperatively is well standardized. The review courses now being put on by the University of Minnesota may help the physician who sees the case first in making a diagnosis.

A brief review of the care of this disease in a city of 6,000 with surrounding small town and agricultural population of about 40,000 may be of interest. There are other hospitals in this territory so that the report for Crookston will include only a certain proportion of the cases in this area. There are two hospitals of a fifty-bed capacity, each fully approved by the American College of Surgeons. This report will be one of hospital cases rather than those of any one surgeon.

\*Read before the annual meeting of the Minnesota State Medical Association, Saint Paul, Minnesota, May 4, 1937.

## ACUTE APPENDICITIS—NORMAN

### CASES OF ACUTE APPENDICITIS

Cared for by members of the Staffs of St. Vincent  
and Bethesda Hospitals, Crookston, Minnesota  
1932-1936

Year	Cases	Simple	Ruptured	Deaths
1932	50	27	23	2
1933	59	33	26	3
1934	41	22	19	0
1935	83	51	32	2
1936	81	57	24	3
Totals	314	190	124	10

From 1932 to 1936, inclusive, 314 cases of acute appendicitis were cared for by the hospital staffs. Of these 314 cases, 190 were clean and there was no death in this group. This nonruptured group included gangrenous cases and those with more or less plastic exudate, cloudy fluid, and evidence of local peritoneal inflammatory reaction. One hundred twenty-four appendices were found to be ruptured at the time of operation. This proportion is surprisingly large as compared to other published reports. This may be partially explained by the fact that, in 1936, out of twenty-four ruptured cases, eleven, or almost half, were admitted with a history of forty-eight hours' illness and that six (25%), of the whole number of ruptured cases, entered with a history of six days' illness. This may be partly explained by the fact that some of these patients were away from good roads in winter and that many tried home remedies. Of these 124 ruptured cases there were ten deaths, a mortality of 8 per cent plus. The mortality for the entire series was 3.1 per cent.

### CASES OF ACUTE APPENDICITIS

Of the ten deaths during the five-year period (1932 to 1936), six were due to general peritonitis or secondary abscess. One occurred in a bed patient with rather an advanced pulmonary tuberculosis in whom the abdominal condition was thought to be tuberculous peritonitis. Later, a large abscess was drained, apparently arising from the appendix. There was no postmortem.

One patient, a woman forty-four years of age, had not seen a physician for a year. She gave a history of weight loss, sleeplessness and nervous-

ness during this period. She developed an acute attack of abdominal pain in the morning and was operated before midnight with drainage of pus. Her pulse was rapid at operation, continued up to 180 and even to 200 within twenty-four hours. Her face was flushed, temperature elevated, and blood pressure high. She lived about two days and appeared much like a patient with thyroid crisis. There was no evidence of bleeding or of embolus, and no symptoms of heart dilatation. Iodine was given per rectum. Autopsy showed a normal abdomen and chest. Death was probably due to a thyrotoxicosis.

One was a patient sixty-two years old, a woman with a history of ten days' duration. A large localized abscess was drained and nothing else attempted. The heart was irregular and râles were present in the chest soon after operation. Death was due to bronchopneumonia and sepsis. The abdomen drained profusely with no evidence of general peritonitis.

A man thirty-six years old had had a high appendiceal abscess treated a year before. He was a jail patient at the time of the present attack. Another high appendiceal abscess was found at operation. The appendix was removed. Death from a subphrenic abscess followed a long period of sepsis.

A study of the records of any such series will demonstrate the fact that the mortality is higher for the cases which are seen late following home treatment, including one or more cathartics. It may also be stated that the mortality of the cases which come in forty-eight to seventy-two hours after the onset of the disease was about three times that of those seen in twenty-four hours, while the mortality when seventy-two or more hours had elapsed was four times that of the twenty-four hour cases. The problem in these perforated cases ceases to be that of appendicitis; the surgeon has a case of peritonitis or abscess to care for. Some of these had been seen by a physician who, because of atypical symptoms and findings, advised watching. Often he was called two or more days later to find rupture had occurred. It would seem that the physician who first sees the patient should insist on having him completely under his control, seeing the patient frequently. It is a question whether even the use of an ice bag in the patient's home is advisable as it might be anesthetic enough to carry the patient

over into ease.

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## ACUTE APPENDICITIS—NORMAN

over into the more dangerous phase of the disease.

The question of diagnosis can only be touched upon here. Pain in appendicitis is the one constant symptom and may be anywhere in the abdomen. The sequence of pain followed by vomiting is present in some 50 per cent of the cases. A leukocyte count of over 20,000 should warn one to have other conditions in mind. Very important is the increase of polynuclears. A child with suspected acute appendicitis should have an x-ray of the chest. If one waits for the classical symptoms of localized lower right abdominal pain with right rectus spasm and extreme tenderness, one is likely to have perforation or gangrene develop. The pelvic type of appendix seems to be one which causes delay.

The patient seen within twenty-four or even thirty-six hours of the onset should be operated upon at once. The profession is agreed as to this treatment. This removes the focus of the disease and convalescence is uneventful as a rule. The mortality will be less than one per cent. When the patient presents himself after the second day the problem is a major one. In some the process will be mild or subsiding. These cases are not so important from the standpoint of mortality. The patient coming in at this period with very definite spasm or a palpable mass presents one of probable local peritonitis although some will have formed abscesses. At this point the profession is divided as to treatment. There is a choice of two procedures; either operation at once or expectant measures. The condition is now one which may mean an extremely difficult operation. There is marked friability of the tissues with much bleeding. The operative mortality is high at this period. Love reports a mortality of 13.7 per cent in 168 cases operated upon in the period from the third to the fifth days, inclusive, in London Hospital.

If one decides to wait and defer operation, the problem is a hard one for the surgeon in the smaller centers. Many physicians and many of the laity have been educated to the opinion that the diagnosis of appendicitis should mean immediate operation. If the surgeon in the small city defers operation and loses a patient, or if he waits and later has to give up expectant treatment, he is criticized for having done nothing. He may have a doubt in his own mind. If he is

masterful, operates at once and loses a patient, he will be considered as one who has done everything possible. Love<sup>7</sup> states that with the expectant treatment one of three things will occur: (1) about 70 per cent will recover; (2) an abscess will form in about 25 per cent of cases, which does not make the case an emergency one (mortality of the abscess cases, 4.5 per cent); or (3) expectant treatment may have to be abandoned (mortality 6.4 per cent). The average mortality is under 3 per cent with expectant treatment. Dixon<sup>8</sup> states that where there is evidence of perforation having occurred within the last ten or twelve hours or if rigidity and localization are confined to the right lower quadrant, operation should be deferred for at least five or six days.

Now that the decision is made to operate, the question arises as to what should be done. The early case presents no problem as immediate appendectomy is the only treatment. This removes the disease condition and the case is under control. The profession is not agreed as to type of treatment for the ruptured appendix or abscess. It would seem logical that if the appendix is free, or can easily be freed from recent adhesions, that appendectomy should be carried out, and that the patient would not be endangered by gently freeing the appendix and ligating the base and meso-appendix. If the appendix is found buried in an abscess wall, often retrocecal with friable, granular tissues and a marked tendency to bleed, the problem presented is a major one. It would seem logical to avoid tearing up such tissues to free a buried appendix, and this very procedure may have added somewhat to the mortality of 1935 as compared to that of 1915, when surgeons were content to drain and nothing more. One is unable to decide this matter from published statistics as good operators of much experience have good reports with either form of treatment. It is possible that in the smalltown hospital it would be advisable to be more conservative in these cases.

The question as to drainage is a very important one. There is a decided tendency to drain less often in the case where the focus of infection can be removed. Cafritz<sup>9</sup> has recently reviewed this subject. He states that a questionnaire to leading surgeons of the country brought back twenty-five negative answers, seven positive

## ACUTE APPENDICITIS—NORMAN

replies and seven answers with reservations. This problem would furnish material for a very complete paper in itself. One can only state that the trend is decidedly to drainage of fewer cases. It is claimed that with no drainage, that fewer secondary abscesses will result and fewer bands of adhesions to cause obstruction. It would seem safer to drain in the case where the primary focus cannot be removed, where there is much necrotic and contaminated tissue left in the abdominal cavity, or in the presence of a walled off abscess. Drainage is being done less often in our local hospitals but the ruptured and abscess cases are being drained. Ileostomy is being used less since the Levine tube, with or without suction, has come into general use. It is possible that cecostomy through the base of the appendix as advocated by DeCourcy may be of value.

The postoperative care of appendicitis today is so improved that many patients are being saved who formerly would have been lost. There is a hope expressed that during the last couple of years there has been some improvement in mortality. If so, improvement is due more to postoperative care than to the type of operation. In the small hospital this means rather close supervision by the surgeon. At present the head of the bed is raised somewhat, though no attempt is made to approach the real Fowler position unless the patient feels more comfortable with his head raised. Sufficient morphin is given for the first three days to reduce peristalsis and to quiet the patient. Subcutaneous saline is given to all patients and in drainage cases glucose is administered intravenously. Later small doses of morphin will add tone to the intestine. In a certain number of cases the Levine tube is used, sometimes with suction. In severe cases blood

transfusions are given. The colon tube may be used, but in the average case the colon is not disturbed for three days. It is hard to see how enemas can be of much value the first couple of days. The simple case is given fluids and food early, the patient being out of bed on the seventh to tenth day, leaving the hospital when he feels able. When drainage has been instituted the patient is observed at intervals for postoperative hernia.

### Conclusions

1. The greatest single factor to account for the high mortality in appendicitis is delay in operation.
2. The patient is responsible for this delay in the great majority of cases, self-treatment, including cathartics, adding greatly to the danger. An educational campaign might reach such persons. Articles in health magazines such as *Hygeia* and *Everybody's Health* reach many.
3. The physician who first sees the patient with appendicitis is in a great measure responsible for the outcome. It is his responsibility to see that the patient enters the hospital where proper examination can be made. The surgeon should feel justified in doing an exploratory operation in the doubtful case.

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# CASE REPORT

## LOBAR PNEUMONIA OF THE AZYGOS LOBE

W. N. GRAVES, A.B., M.D.

Duluth, Minnesota

THIS case is presented to prove further the dictum that the azygos lobe of the lung is heir to any pathologic condition which may affect the other lobes.

Resolution was observed fluoroscopically and a second plate made November 2, 1936, showed clear lung parenchyma above the azygos sulcus (Fig. 2).

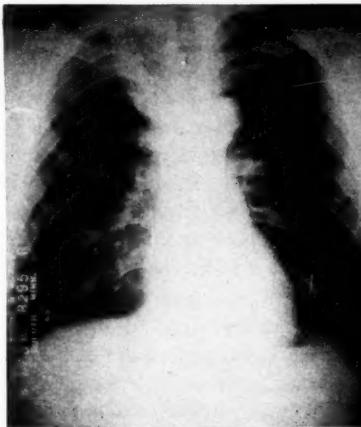


Fig. 1.

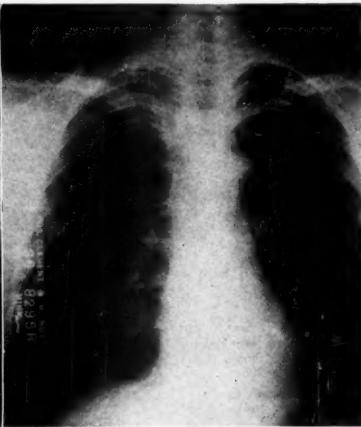


Fig. 2.

E. J. McM., a male, twenty-seven years of age, was taken ill September 10, 1936. The onset was sudden while at his office, with a mild chill followed by malaise and pain in his right chest. He immediately retired to his bed and soon developed a cough which was mildly productive. His temperature, as taken by his wife, was 101 degrees F. I was called to see him two days later because his symptoms remained unchanged. His temperature was 101.6 degrees F., pulse 100, respiration 20, blood pressure 122 mm. of mercury systolic, 86 diastolic. His chief complaints at this time were malaise, cough, and soreness in the right chest above the nipple region. No changes were noted in the examination other than a few moist râles which were heard at the bases of both lungs posteriorly. He was treated symptomatically and showed no change in the findings until the fifth day after the onset, when his temperature suddenly became normal and he noted general improvement of all symptoms. Examination made two days later at my office showed practically normal findings both physically and by laboratory tests. Stereoscopic x-ray plates were made of the chest, which showed consolidation of the azygos lobe (Fig. 1).

EDITOR'S NOTE: It is interesting to note that the standard anatomies give little or no information as to the azygos lobe of the lung, although it was first described in 1778 by Wrisberg. Some twenty-three cases which had been reported in the literature were reviewed by Stibbe in 1916. In 1923 Wessler and Jackes first drew attention to a comma-shaped shadow near the right lung apex, occasionally seen in anterior-posterior chest x-rays, but the significance of the shadow was not known until Wessler and Bantick, in 1928, checked the shadow in two cases at autopsy and proved it was due to an anomalous course of the azygos major vein. It is estimated that in about one in 1,000 individuals the azygos major vein, instead of closely adhering to the vertebral column as it curves forward to join the superior vena cava, swings away, carrying with it a fold of parietal pleura. This partitions off a small portion of the right upper lobe along its mesial surface, which communicates below. The vein and pleural layers account for the comma-shaped shadow where the azygos vein joins the superior vena cava and the fine line with its convexity outward, which is visible in the x-ray plate in these cases. Pneumonia involving this lobe is nicely shown in the accompanying report.

## EDITORIAL

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#### BUSINESS MANAGER

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### Periarteritis Nodosa

PERIARTERITIS nodosa is a rare disease but since it was first described more than sixty-five years ago by Kussmaul and Maier, it has always been a source of interest both to the clinician and the pathologist. The clinician's interest is usually aroused because the patient presents a picture which is obscure and the interest of the pathologist is usually stimulated because in a lifetime, he has relatively few opportunities to study cases of his own.

The etiology of the disease is unknown. It has been suggested that the condition represents a specific infectious disease of bacterial or virus origin. No organism has, however, been isolated from human cases with any consistency, and while ground material from human nodules injected into rabbits has produced suggestive

lesions, this work has not been conclusive. In support of a possible virus etiology is the fact that the disease has been described in deer and swine. Certain authorities consider it an allergic manifestation of rheumatic disease. The fact that the lesions are vascular and resemble slightly experimental allergic inflammation, a possible protein sensitivity basis has been considered though its association with asthma is too infrequent to have any significance.

Pathologically the disease is characterized by the formation of inflammatory nodules on arteries the size of the coronaries or smaller. The nodules vary from one to five millimeters in diameter and are situated eccentrically or at the bifurcations. Large vessels and capillaries are spared. The lesion begins as an accumulation of inflammatory cells in the adventitia and progresses to involve all vessel coats. The inflammation consists of polymorphonuclear leukocytes, lymphocytes, plasma cells, and eosinophiles. Eosinophiles may predominate and be the characteristic cell of the lesion. Where the process has destroyed the muscle and internal elastic membrane of the vessel, small aneurysms and thromboses form. The damage secondary to these vascular lesions produces the picture seen at autopsy. This is usually one of hemorrhage or infarction. While the disease is always fatal, it sometimes has a chronic course and the lesions are known to heal by fibrosis. The disease is wide-spread throughout the body and any organ may be affected. Bearing this in mind the protein nature of its clinical manifestations is better understood.

The fact that the clinical picture is so bewildering can be explained when it is considered that we are dealing with an infectious process producing a systemic reaction characterized by prostration, fever, tachycardia, cutaneous eruptions, and leukocytosis, in addition to the widespread damage done by the vascular lesions described above. (Harbitz). For convenience the disease is sometimes classified into six types: gastrointestinal, renal, neuro-muscular, cardiac, cerebral, and cutaneous. The outstanding clinical characteristic of the disease is the fact

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that the severity of the symptoms is out of proportion to the findings the examiner is able to elicit and the location and severity of these symptoms is dependent on the organ involved and the degree of vascular damage. When the intestine is attacked, the picture may resemble an acute inflammatory condition in the abdomen and many patients have been operated upon for acute appendicitis, the real nature of the disease being revealed by histologic study of the appendix. The kidney may be involved and the damage may be sufficiently wide-spread to cause renal insufficiency or massive hemorrhages may occur in the retroperitoneal tissues. The neuromuscular type of the disease may be mistaken for rheumatism or neuritis of various forms. Cardiac lesions are found in a high percentage of cases. These may range from simple nodules on the coronary vessels to hemopericardium and infarction of the auricle or ventricle. Central nervous system involvement is considered rare but massive cerebral hemorrhages have been reported. Skin lesions are not infrequently seen. These present themselves as nodules, a macular rash, hemorrhage, or even necrosis. Biopsy of the skin lesion may establish the clinical diagnosis. The correct clinical diagnosis in the reported cases is said to have been made (Spiegel) in only 12 per cent of the cases.

J. F. U.

### The Women's Field Army Program And The Physician

AFTER a year's experience in nearly forty states the Women's Field Army Against Cancer of the American Society for the Control of Cancer is extending its work into practically every state. This program is unique in the history of health education movements in that *from the beginning* the medical profession has been asked to direct the work. In every state lay leaders have been appointed only with the approval of medical organizations.

In this Women's Field Army plan lay speakers are discouraged from speaking on the scientific aspects of cancer. This phase of the program has been placed in the hands of physicians in the belief that a physician is the properly qualified person to discuss this subject before lay

groups. The activities of lay workers are restricted to organization and other problems. It is thus seen that the program is being developed along lines most favorable to the physician. By this same token there is placed on the physician the responsibility of making the program as effective as possible.

The program is built around the fact that early cancer is curable, and to detect it in early stages the periodic examination of the apparently well individual must be employed. As a result of the public discussion of this subject thousands of persons for the first time have sought examination by their physician to determine the presence or absence of cancer. As the program develops thousands more will ask for this same service. This makes it essential that physicians be on the lookout for precancerous lesions as well as signs of early cancer, and conduct these examinations in as thorough and painstaking a manner as possible. A patient requesting such an examination is entitled to the best service the physician can give, regardless of objective absence of disease. After obvious signs of cancer appear it is often too late to render a curative service; therefore, no physician should make light of any patient's request for an examination.

No physician should hesitate to avail himself of facilities for obtaining the answer to the patient's problem when such facilities are not at his immediate disposal. The diagnosis and treatment of cancer is a group problem, and no physician has the ability alone to cope adequately with all forms of the disease.

One criticism emanating from medical sources is that a lay cancer educational program will create a cancerphobia in the public mind. In answer it should be remembered that an intelligent request for information about cancer is not cancerphobia; also, that cancerphobia never metastasizes and never kills.

Another criticism coming from a few laymen is that this emphasis on periodic examinations is but a dodge on the part of the medical profession to increase its income. Such criticism should not be taken seriously, and should be answered by pointing out that only by early diagnosis and treatment can the cancer patient be saved from an untimely death. If the profession wanted to profit from this situation it

## EDITORIAL

could do so in far greater measure by neglecting the early stages of cancer knowing that the care of the incurable patient would be far more prolonged and remunerative.

With this opportunity for constructive participation in a nation-wide health education movement the physicians of Minnesota should see to it that no patient is denied the fullest measure of service within the power of physicians to render. Only by such a service can they expect to retain direction of this program.

—F. L. R.

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### Principles And Proposals of the "Committee of Physicians"

THE presumption of the self-styled Committee of Physicians to advocate as individuals fundamental changes in medical practice has rightly aroused a wide-spread feeling of indignation in the ranks of the profession. The worst feature of the declaration of Principles and Proposals of the Committee is the impression given the public and commented upon editorially in the press that there is a widespread revolt against the action of the House of Delegates of the American Medical Association at Atlantic City.

In the first place the 430 signers of the Principles and Proposals of the Committee of Physicians, although numbering prominent members of the profession, constitute less than half of one per cent of the members of the organized profession, and their advocacy of increased governmental participation in medical practice cannot be construed as the viewpoint of the profession at large. Many of the signers of the declaration hold positions which would be glorified by the proposed radical departure from the present practice. Many signed without mature deliberation and because they were asked to do so. Many have already retracted.

The American Medical Association composed of some 106,000 physicians is the body which should formulate the policies of the profession and any difference of opinion should be expressed within the organization and not without. The sum and substance of the Principles and Proposals of the Committee of Physicians was presented to our national House of Delegates at

its last meeting and was overwhelmingly rejected. A nationwide campaign in the public press was then decided upon by the proponents of these so-called principles and this group of physicians coöperated by permitting the publication of their names, and their professional attainments. Actions such as this cannot be too heartily condemned by our profession. We predict that this effort, originating outside the profession and sponsored by a few inside, will strengthen the position of the organization.

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### DEATHS FOLLOWING ELIXIR SULFANILAMIDE-MASSENGILL

Nine out of ten patients who had been given a proprietary elixir of sulfanilamide died recently in Tulsa, Okla., from anuria which apparently resulted directly from poisoning by this elixir. Subsequently there was received a report of four additional deaths, with another likely fatality in East St. Louis. The product was prepared and sold by the S. E. Massengill Company of Bristol, Tenn. From tests by the chemical laboratory of the American Medical Association, this elixir appears to be a solution of approximately 40 grains of sulfanilamide to a fluidounce of a menstruum containing about 72 per cent of diethylene glycol (by volume) with flavoring. The solvent, diethylene glycol, is itself not an indifferent substance. The dosage of the elixir administered unquestionably contained a large amount of this substance. It would appear to be clear that the diethylene glycol or the diethylene glycol-sulfanilamide combination rather than the sulfanilamide was responsible; one of the patients had received tablets over a period of two weeks without any bad effects and then showed the typical train of symptoms after taking the elixir. From twenty-four to forty-eight hours after administration of the substance, nausea, vomiting, malaise and sometimes diarrhea developed; then complete anuria appeared within two to five days. The laboratory of the American Medical Association is conducting careful chemical and pharmacologic experiments to indicate the toxic factors of the elixir concerned. This tragic experience should be a final warning to physicians relative to the prescribing and administration of semisecret, unstandardized preparations. The Council on Pharmacy and Chemistry has not accepted any stock solution of this substance. It has accepted a sufficient number of preparations developed by manufacturers to supply the needs of the medical profession for this substance in the present state of our knowledge. Acceptance by the Council indicates that the products have been examined and that there is sufficient clinical evidence relating to their use to indicate at least their safety when prescribed in the designated manner. (J. A. M. A., Oct. 23, 1937, p. 1367.)

# MEDICAL ECONOMICS

Edited by the Committee on Medical Economics  
of the  
Minnesota State Medical Association

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## Doctor Fishbein Speaking

DR. Morris Fishbein came to the Twin Cities to make the principal address for the Minnesota Public Health Association's Annual banquet at a time when momentous things were happening in American Medicine.

Doctor Fishbein, both as spokesman for the American Medical Association and as a keen observer on his own account, knows more about these matters than any man in America.

Out of two full days spent in Saint Paul and Minneapolis he took time out only for the Northwestern-Gopher Homecoming game. Otherwise, breakfasts, luncheons, dinners and midnight parleys were continuously occupied in talking to interested doctors—or to large public groups.

## Highlights

Here are highlights of what Doctor Fishbein told two groups at breakfast, Friday, November 12, and Saturday, November 13. The Friday breakfast had as outside guests, the managing editors of St. Paul newspapers. The Saturday breakfast was attended by council members, committee chairmen, speakers on the general subject of Social Medicine for the College Lecture Course annually sponsored by the Minnesota State Medical Association and the Minnesota Public Health Association. All were enthusiastic.

## Carnage is Terrific

Said Doctor Fishbein:

"The record of organized medicine in America for the last decade is inspiring.

"One threat has been dismissed after another. From each we have emerged in better form and in a better strategic position. Looking back at the fate of the tacklers who have successively carried the attack, we can see now that the carnage has been terrific.

## New Threat

"The new threat—the so-called 'split' in the American Medical Association occasioned by the petition of the 'Committee of Physicians' and signed by the now famous 430—is more insidious than any of those that preceded it.

## "Splitting" Medicine

"Not that the action of 430 men, most of them full-time men in the schools and laboratories, out of a total of 106,000 who are members of the American Medical Association, really represents a split in the 106,000.

"The danger lies in the possibility that other men may thoughtlessly and carelessly do what many of the 430 did—lend their names to movements and petitions that they do not fully understand. Then there will be more talk of splitting organized medicine and the position of medicine before the Congress and the people will be definitely weakened.

"If the Committee on Physicians incident serves to bring this danger to the attention of all our members and warn them against it, it will serve a good purpose.

\* \* \*

"In the past three days, sixty men have written to me that they signed without any clear conception of the use to be made of their names—merely because the signers seemed to be good men, or because someone asked them, or for other trivial and irrelevant reasons.

## History and Background

"Here is the history and background of the incident. When the work of American Foundation Studies in Government approached a conclusion, Miss Esther Everett Lape, member in charge, approached officials of the American Medical Association with the information that considerable pressure was being brought to organize a group of physicians who should draw up conclusions and recommendations based upon their studies in medicine. We added some names to a suggested list. Some of the men thus invited refused to be associated with the undertaking. Later, others were invited to lunch with Miss Lape and Mrs. Roosevelt with the understanding that they would present their conclusions to the President.

"The President was reported to have said (Bear in mind, one does not quote the President): What is the

## MEDICAL ECONOMICS

attitude of the American Medical profession? Does the medical profession approve?

The little group of invitees drew up some principles and proposals that closely paralleled the resolution submitted to the House of Delegates of the American Medical Association.

\* \* \*

Near the end of the sessions of the New York Medical Society's House of Delegates, the principles and proposals later presented at Atlantic City were passed and Doctor Kopetzky, a delegate, brought the report to Atlantic City.

### Possibilities for Harm

"The result of that fight and the definite rejection of the proposal by the House of Delegates is well known. The Principles and Proposals circulated by the Committee of Physicians, now erroneously said to have 'split' the American Medical Association, represent a new effort by the same group to carry out its plan.

"The object is to get as many good names as possible so that Congress and the public will believe in the split. The methods are questionable. The action of the men who thoughtlessly lend their names to the project is worse than questionable. It holds possibilities for serious harm.

\* \* \*

"Incidentally, I never saw a more dismayed countenance than one presented by a Chicago signer confronted by a story run subsequently in the *New York Times*. The headlines read like this: 'PHYSICIANS REVOLT IN FAVOR OF STATE MEDICINE.' Like so many others, this man was one of the inadvertent signers.

### Objections

"As to the Principles and Proposals, themselves: I have pointed out in the JOURNAL and in a communication to the *New York Times*, the threat to the independence of the medical profession and of the hospitals in the United States that lies in Federal subsidies. Whenever the government supplies funds, the government must also approve plans. Under such circumstances medical standards are bound to deteriorate; progress wanes.

"The proposals provide also for the creation of a new class; the class of 'medical indigent' which may embrace about 90 per cent of the population.

\* \* \*

"These medically indigent have been said to include all of the families in the United States whose income is \$3,000 a year or under. If we should pledge ourselves to provide medical care for the millions of Americans in this class, we should nearly pledge ourselves to the Russian system of State Medicine.

"In that connection, any of you who want to know what the Russian system is like should read the book just published by a correspondent of the United Press who spent six years in Russia, went there avowedly sympathetic to Communism and left at the invitation of the government, stripped of all illusions. This corre-

spondent, whose name is Eugene Lyons, is probably better informed on Red Medicine than the authors of the book called *Red Medicine*, which was written after a whirlwind tour of six weeks by John Kingsbury and Sir Arthur Newsholme. The Lyons book is called 'Assignment in Utopia' and I heartily recommend it to anyone who is interested in Russia.

### Just One Week!

"Another book on Russia, 'Soviet Medicine,' by Sigerist of Johns Hopkins, is off the Press this week. The author is typical of the virtuosi who consider that progress is merely change and that a change from the American to the Russian system would necessarily be progressive. The aptest comment on all these hopeful efforts appears in the Lyons work. Anyone who admires Russian medicine should spend just one week in the second best hospital in all Russia, says Mr. Lyons.

\* \* \*

"In Russia, and in the United States, if the 430 signers have their way, all matters relating to the distribution of medical care, are to be in the hands of 'experts.' And the experts in this case are naturally the social workers, the economists, and minor bureaucrats.

"If medicine is put in the control of the 'experts' there is no future in medicine at all.

\* \* \*

"What do the proposals of the Committee on Physicians and all advocates of State Medicine offer the physician?

"They offer the young man in medicine and the less competent practitioner a better income earlier in his career.

### What of the Future?

"But beware the Greeks who come bearing gifts! The young men in England enter the panel early because it offers an immediate income when they leave school. They do not accept fellowships, residencies, further opportunities to study so that they may become consultants later on.

"The result is that few specialists are being trained in England to take the place of the older generation that is passing. The young men who went into panel practice stay there, weighed down by too many duties and by inertia, inevitably becoming slip-shod and rusty in the practice of their profession.

"Who is to man the voluntary hospitals and where are the consultants of the future in England?

### In America, Too

"It was the lower income bracket, amounting to about 25 per cent of the practicing profession, that favored sickness insurance and brought about the system of panel practice in England.

"In America we have the same group to fear. So far as the 430 themselves are concerned, I believe we have no need to worry. Before long they will have realized the error of their ways—or the futility of further effort. But there are always a few—I don't

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## MEDICAL ECONOMICS

know how many, of course,—who would sign away the whole profession for an income increase of twenty per cent.

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"Has the American Medical Association a definite policy? Why does not the A.M.A. offer a 'plan' for medical care? Yes, the American Medical Association has a definite policy but it is manifestly impossible to develop any one plan which will properly embody this policy all over the United States. Conditions vary widely from community to community.

"We can and do study experiments of various kinds that are being carried on all over the country. We can evaluate them, suggest improvement and assist, where it seems wise, in extending these plans.

"The policy of the American Medical Association is directed toward one end: protection of the quality of medical care.

### Doctors Must Talk

"This is the policy and objective that physicians everywhere must emphasize at every opportunity. The public is interested; open forum meetings, luncheon club programs, are open to speakers on the subject. Mr. William Trufont Foster and Mr. Michael Davis are speaking at these meetings; they are angling for debates on the subject. Physicians must be prepared to discuss it intelligently. They drive home aspects of the problem that are largely overlooked by these enthusiasts for State Medicine.

\* \* \*

"Do not forget that enthusiasts propose to take care of about ninety per cent of the people, by the check-off system. Tell your audiences this: They propose to take care of you with YOUR money, checked off from your wages.

"At what point will this check-off stop? It has begun with Old Age Benefits and Unemployment Insurance in the United States.

"Surely there is a fundamental threat to democracy in a system by which government takes increasing portions of income to do for its workers what the workers could otherwise do for themselves.

\* \* \*

### "Abolish Bureaucracy"

"Personally, I believe there will be a turn in America, however. Last summer, Senator J. Hamilton Lewis came to Atlantic City to feel out the American Medical Association on federalization of care of the indigent and low income groups; later he introduced a resolution asking for such a change in the United States Senate. Yesterday a story appeared in the papers quoting the Senator to a very different effect. The Senator has been to Germany; he has seen the check-off system in action. He has seen bureaucracies at work. Now he says for quotation: 'We must abolish bureaucracies.' State Medicine, Insurance Medicine cannot run without bureaus.

### Look for the Politician

"Medicine in America is on a higher plane than anywhere else in the world today. When people tell you that one third of our people lack adequate medical care, look behind the figures and see if they are not inspired by some politician who wants a change and a new job.

"Of course, there are the indigent. They must be cared for, as always. And we doctors who wish to preserve the best in American medicine must see to it, especially, that they are cared for. That has always been our responsibility. We do not shirk our share in it now.

\* \* \*

### Welcome Aid

"There is a method by which government funds can be safely and effectively used to assist in the care of those who cannot pay the whole bill for expensive treatment themselves. The government can assist in providing the costly materials, the serums, laboratory procedures and x-rays that the physician needs for modern diagnosis and treatment of his patients.

"So long as government funds are used for materials and not for service, standards of care should not be endangered. This type of assistance is already available to a considerable extent and the indications are that it will be extended.

### New Legislation

"The tragic deaths from elixir of sulfanilamide will probably serve to bring about passage, at least, of new food and drugs legislation at the special session of Congress. I look for no other major legislation at this session that will materially affect the practice of medicine.

\* \* \*

"The plan for reorganization of government offices that is most favored, apparently, by the administration calls for a Department of Public Welfare. This department is to include within its jurisdiction education, charity, WPA, the Youth Administration, Public Health and Medicine, with the exception of the medical departments of the Army and Navy.

"Under such an arrangement, health and medicine would undoubtedly be the business of a third assistant secretary, possibly under Harry Hopkins (generally accepted as the probable head of such a department).

"It is most unlikely that Surgeon General Thomas Parran would relish the opportunity to become a third assistant secretary in any cabinet department.

"Naturally, the American Medical Association is opposed to such a reorganization. Health should be the business of an independent department, headed by a qualified physician. It is said to be unlikely that the Congress will enact any such legislation at the special session."

## Opportunity

(Monthly Editorial Prepared by the Medical Advisory Committee)

Since history began we find that two things have been uppermost in the minds of man: the sustaining of life, and the propagation of the race—purely animal instincts. To refine and control these came the professions of teaching, law, ministry, and medicine.

The first teacher was the "old man" of the family gradually evolving into the elaborate school systems of today, wherein we are taught the tenets of self control.

The law began with admonitions as laid down for the protection of family life, the "Do unto others as you would have others do unto you." Now we find the temples of justice for the interpreting of the law builded on every hand, teaching us the rights of others as well as ourselves.

The ministry began with the mystery of life, the whys and wherefores of the terrestrial bodies, the seasons, the worry about the hereafter. Today we find millions who worship according to their own dictates in huge religious edifices, spreading the gospel of tolerance.

Medicine had its beginning in superstition, the thought that all disease was a retaliation from the gods. Gradually we have erected, not only a place for ourselves as members of one of the oldest and noblest professions on earth in government, but, more to be desired, a place in the hearts of man which nothing can supplant. Intimate contact gives us a chance to observe the frailty of human nature.

The homes of the nation are the places of our greatest opportunities to promote the tenets of good living and good government. Have we taken advantage of this opportunity to mold public opinion?

Your Medical Advisory Committee believes that as business is being transacted more and more on the basis of friendship and cordiality, so the medical profession should promote good fellowship and mutual understanding among its members. Let us give a thanksgiving for the opportunities that have been ours in the past. Let us have a hope that the new year will bring renewed opportunities for service to mankind without the fettering strings of outside supervision.

## Insurance in San Francisco

Sickness insurance for government workers holds grave possibilities for the future; should be watched.

A plan for complete hospitalization and medical attention for San Francisco's 13,000 municipal employees got underway with a charter amendment passed by the voters last March. Contracts are being approved. Two or three other cities are doing the same thing.

The insurance plan for Washington employees of the Federal Home Loan Board is still going quietly forward though the machine is not actually set up and the charter is said to have been kept out of the hands, even, of curious members of the House of Representatives and the Senate who have asked for copies.

The step is not far from voluntary sickness insurance for large groups of government employees to the same service for other large groups of employees. The step from many unsatisfactory voluntary systems of sickness insurance to compulsory insurance for all is almost inevitable, as European experience shows.

## Difficulties

Sickness insurance went onto the statute books of British Columbia some years ago but two or three years are still likely to elapse before it goes into effect, according to Premier Patullo in a recent interview. It waits now upon the report of a commission which cannot report, at best, until 1939. In the meantime, the commission is ironing out difficulties with the medical profession among them the income limit for insureds, which has already been lowered from \$1,800 to \$1,500 a year.

## Minnesota State Board of Medical Examiners

### A Warning from the Minnesota State Board of Medical Examiners Concerning the Handling of Narcotics

To the Members of the Medical Profession of Minnesota:

During the year 1937 the Minnesota State Board of Medical Examiners found it necessary to summon twenty-one Minnesota physicians before the Board for violations of the Harrison Narcotic Law and for drug addiction. Fourteen physicians were in trouble because

## MEDICAL ECONOMICS

of infractions of the law relating to the prescribing and dispensing of narcotics to addicts, while seven of the physicians were before the Board because of habitual indulgence in their own use of morphine. The seven cases involving addiction were referred by the Narcotic Bureau to the Medical Board for disposition. In the other group, four out of the fourteen physicians were indicted by the Federal Grand Jury and all pleaded guilty. Fines totaling \$1,300 were paid by two physicians; two physicians were placed on probation. The remaining ten physicians were permitted to submit offers in compromise totaling \$1,275 and in addition their cases were referred to the Medical Board.

The Medical Board conducted hearings at each Board meeting during the year on these cases. Each case was investigated by Mr. Brist, attorney for the Board, prior to the hearing. In every case involving addiction of the physician, the Board orders the surrender of the stamp tax and right to dispense or prescribe narcotics. In three of the cases involving addiction the physicians are not practicing. In one case the physician was ordered not to practice pending treatment; in another case the suggestion was made that the physician retire from the practice of medicine. In the other group ten out of the fourteen physicians were voted a reprimand; the license to practice medicine of another was revoked, while the other three lost their privilege of dispensing and prescribing narcotics.

The youngest physician before the Board was twenty-six years of age, while the oldest was eighty. Four physicians in the first group involving addiction were members of the Minnesota State Medical Association. In the other group five out of the fourteen physicians were members of the Minnesota State Medical Association. The Board was quite surprised to hear several of the younger physicians who are recent graduates of the University of Minnesota state that they had no knowledge of the provisions of the Harrison Law and that they were quite certain they had not heard about it in the Medical School. The Medical Board believes that it would be very advantageous to the medical profession if more emphasis were placed on this subject in the medical curriculum. A suggestion might be to invite a well-versed member of the Narcotic Bureau or United States Attorney's office to give a lecture each year to the medical students and in addition the Medical Board would be very glad to coöperate by furnishing a member of the Board to give a friendly lecture on the problem as the Board views it from their experience.

In conclusion, the Medical Board wishes to state that they do not intend to be as lenient in the future in these cases. The stock excuse of most physicians is that they were "framed." Is it not quite a task to frame a physician who practices medicine in good faith, particularly one who insists on examination and diagnosis? Can good faith even enter the picture when the fundamentals of medical practice are absent and prescriptions are sold at \$5.00 each? The Medical Board does not approve of some of the tactics used in the past in obtaining evidence to enforce the narcotic laws, but if every physician will remember what a Federal judge said in sentencing a Minnesota physician for a violation of the Harrison Law, he will have no occasion to appear either before the Narcotic Bureau, in Federal Court or before this Board. The statement was: "The mere fact that you are educated as a physician presupposes intelligence." The Board has made an honest effort to coöperate with the Narcotic Bureau, the United States Attorney's office and the Federal Court. After reviewing these cases the Board believes that considerable leniency has been shown the physicians involved, by various governmental agencies, and in so far as the Medical Board is concerned, unless that leniency is rewarded with a reduction in these cases to a very minimum, there will be more licenses to practice medicine revoked. The Board desires to be friendly

and fair, but it has a duty to perform, and unless it does perform it, some other agency will probably be asked to do it. The Medical Board invites the sincere coöperation of every person practicing medicine in this state and respectfully asks that this matter be given the attention that its seriousness warrants at medical meetings throughout the state. The Board is fully aware of the fact that these twenty-one cases do not represent the total number of physicians in Minnesota who violate the Harrison Narcotic Law and a decided improvement is assuredly in order.

Remember, when a person comes into your office asking for narcotics, the answer is "No!"

This statement issued by order of the Minnesota State Board of Medical Examiners this 12th day of November, 1937.

(Seal) (Signed) JULIAN F. DUBOIS, M.D.,  
Secretary.

### Minneapolis Woman Pleads Guilty to Sale of Contraceptives

Re: State of Minnesota vs. Cecelia Scott

On November 22, 1937, Mrs. Cecelia Scott, thirty years of age, entered a plea of guilty in the District Court of Hennepin County at Minneapolis, to an information charging her with the unlawful sale of contraceptives. Mrs. Scott is not licensed to practice any form of healing in the State of Minnesota and resided at 118 West 39th Street, Minneapolis. After a statement of the facts to the Court the defendant was sentenced by the Honorable Arthur W. Selover, Judge of the District Court, to pay a fine of \$75.00 or serve sixty days in the Minneapolis Work House. Mrs. Scott paid the fine, and stated to the Court that she would obey the law in the future.

Mrs. Scott stated that she came to Minneapolis in the spring of 1937, from Kansas City, Missouri; that she represented The Smith Laboratories Corp., and that they had an office at 408 Wesley Temple Building. According to the literature distributed by Mrs. Scott, The Smith Laboratories are the sole manufacturers of Colagyn and Phyllassogyn. Mrs. Scott did not confine her contacts to the medical profession but went to private homes because of information that she obtained through the daily birth notices in the Minneapolis newspapers. She charged \$6.00 for her so-called "set" and refills were sold at the rate of \$2.00 each. When policewomen called upon Mrs. Scott they were told, among other things, that a physical examination could be arranged for them at the office of Arthur Kolling, a chiropractor in Minneapolis. Kolling has no license to practice medicine in the State of Minnesota, and already has a previous conviction for practicing medicine without a license. Mrs. Scott stated that she had no business connection of any kind with Kolling but had learned of him through a customer. She stated that she had no knowledge that he was a chiropractor.

For the convenience of the medical profession, the laws of the State of Minnesota on this subject are as follows:

"Every person who shall sell, lend, or give away, or in any manner exhibit, or offer to sell, lend, or give away, or have in his possession with intent to sell, lend, give away, or advertise or offer for sale, loan or distribution, any instrument or article, or any drug or medicine, for the prevention of conception or for causing unlawful abortion; or shall write or print, or cause to be written or printed a card, circular, pamphlet, advertisement, or notice of any kind, or shall give oral information, stating when, where, how, of whom or by what means such article or medicine can be obtained or who manufactures it—shall be guilty of a gross misdemeanor, and punished by imprisonment in the county jail for not more than one year, or by a fine of not more than five hundred dollars, or by both."

—Section 10188, Mason's Minnesota Statutes for 1927.

## COLLECTION METHODS

"Every person who shall deposit or cause to be deposited in any postoffice in the state, or place in charge of any express company or other common carrier or person for transportation any of the articles or things specified in Sections 10187, 10188, or any circular, book, pamphlet, advertisement, or notice relating thereto, with the intent of having the same conveyed by mail, express, or in any other manner; or who shall knowingly or wilfully receive the same with intent to carry or convey it, so shall knowingly carry or convey the same by express, or in any other manner except by United States mail—shall be guilty of a misdemeanor. But the provisions of this section and Section 10188 shall not be construed to apply to an article or instrument used by physicians lawfully practicing, or by their direction or prescription, for the cure or prevention of disease."

—Section 10189, Mason's Minnesota Statutes for 1927.

### Canby Physician's License Suspended for Two Years

#### In the Matter of the Revocation of the License of John Lynn Erickson, M.D.

Following a hearing held by the Minnesota State Board of Medical Examiners on November 12, 1937, the license to practice medicine held by John Lynn Erickson, M.D., of Canby, Minnesota, was suspended for a period of two years. Dr. Erickson was cited to appear before the Board because of conduct unbecoming a person licensed to practice medicine and detrimental to the best interests of the public. The citation was issued following an investigation made by the Board into the circumstances surrounding the death of a patient of Dr. Erickson, and the use of alcoholic beverages by Dr. Erickson. It was also brought out at the hearing that Dr. Erickson had been convicted on October 31, 1937, in Lincoln County, of driving a motor vehicle while under the influence of intoxicating liquor.

Dr. Erickson was born at Canby, Minnesota, February 10, 1888. He is a graduate in medicine in the University of Minnesota, 1923, and was licensed by the Minnesota Board the same year. Dr. Erickson has practiced at Twin Valley, Hendricks and Canby, Minnesota.

### Treatment of Undescended Testicle

Dr. R. E. Smith, medical officer of Rugby School, said that he had under observation 600 boys between the ages of 13 and 18 in one school and some 400 between the ages of 9 and 18 in another. In six years he had collected data on twenty-three cases of undescended testicle and found that the testicles usually descended into the scrotum at puberty in the majority of those who reached it. The age of descent varied from 12½ to 14½ years in seven cases. In an eighth it was 16½ years, but this boy had general endocrine deficiency. Of three failures one had an ectopic testis and one had had an unsuccessful operation at the age of 8 years. The remainder of the boys being observed have not reached puberty, their ages being from 9 to 14 years. Dr. Smith therefore concluded that the undescended testes should be left to nature until puberty, provided ectopic testes can be excluded. If no change then occurs, gonadotrophic extract should be given in full doses. If this fails, the aid of the surgeon should be sought to ascertain whether some abnormality is preventing descent.—Foreign Letters—London, Jour. Am. Med. Assn., 109:1734, (Nov. 20) 1937.

## COLLECTION METHODS

One of our readers after reading an article entitled "The Collection Agency Racket" by Stanley B. Houck, which appeared in the September number of MINNESOTA MEDICINE, submitted the following form which he has used with satisfaction. As he states, the representative of the collection agency signs the form, which is made out in duplicate.

IT IS HEREBY AGREED, In the acceptance of the following named account for collection the following named conditions are accepted and will be observed: 1. The ownership of the account at all times rests in the name of John Doe. 2. At any time the owner of the account may withdraw the account from collection, subject only to payment for collections made. There shall be no additional charges made against the withdrawn account for attorney's fees, court costs, postal charges, or services rendered by the collection agency. If the withdrawn account be paid within sixty days after withdrawal, it is to be considered paid through the collection agency and subject to the agreed charges for collection. 3. There shall be at all times an effort made to retain for John Doe, the respect, confidence, and goodwill of the debtor. 4. There shall be no legal proceedings undertaken without the owners written consent. 5. The rate for collection is not to exceed 50% in total charges. 6. A written report of progress, or action taken toward collection of this account shall be rendered quarterly. If, after one year, no progress has been made, the account shall be returned to John Doe, without charge for services, and the account considered dropped.

Name of debtor.....  
Address.....  
Amount due.....  
Date first services rendered.....  
Date last services rendered.....  
Total amount paid on account.....  
Date of last payment.....  
RECEIVED of John Doe the above named account subject to the conditions of the agreement.  
Minneapolis, Minn. ....  
Date.....  
SUBSEQUENT DATA.

A second form is a contract for payment which will become a note if payments are not kept up. The attractive feature to the patient is that no interest is paid if he makes his payments. For the doctor it is an acknowledgment of the account. If the patient is honest and intends to pay, there is little trouble securing his signature to pay a certain amount periodically. The second form is as follows:

\$..... Minneapolis, Minn. .... 19....

M..... To John Doe, Dr.

To Professional Services Rendered.....

the sum of..... DOLLARS

I acknowledge the correctness of the above account and agree to pay the same.....

....., with interest at six per cent upon any unpaid balance after.....

It is also agreed; failure to make payment upon any payment date renders the entire balance due, as of that date, and interest to be reckoned, as from that date.

Patients so often forget they have an obligation when they only verbally promise to settle an account by paying a little each month, that the above method seems quite worth while.

## IN MEMORIAM

### In Memoriam

**William C. Portmann**  
1858-1937

Dr. W. C. Portmann was born at Herpertswoyle, Switzerland, on June 7, 1858. He was the seventh of ten children. His father, Ursus Victor Portmann, was

a well known civil engineer, builder and architect. His mother was Anna Maria Hug Portmann.

Influenced by his impressions on a previous visit, the doctor's father moved the family to the United States, arriving at Navarre, Stark County, Ohio, in 1869. There he quickly found employment as a builder, and an older brother of Dr. Portmann was educated in medicine and later became the physician to

President McKinley and his family.

The family moved to Canton, Ohio, in 1871, and there Dr. Portmann received his elementary education. His father having died in 1873, the family was in very difficult situation financially. Dr. Portmann was employed by The Diebolt Safe & Lock Works at Canton, and by his energy and ingenuity in improving methods, and by extra hours as a plumber, he saved enough money for his medical education.

The doctor attended school at the Western Reserve Medical College in Cleveland and was graduated from that college in 1881. He then practiced for about two years at Canton, Ohio, with his older brother, Dr. E. O. Portmann, and there met, and on September 13, 1883, married Emma Elizabeth Ball, the daughter of Ephriam Ball, a manufacturer and the inventor of many improvements on harvesting machinery.

Doctor Portmann and his bride started the morning of their wedding day to Mandan, South Dakota. There the young doctor found that the expiring land boom made earning a living a difficult matter, and after three years of struggle, he moved to Jackson, Minnesota. At Jackson, the doctor practiced for more than forty years. He returned to Canton, Ohio, upon one occasion for less than a year, but moved back to Jackson.

In the early days, his teams and "buggy" were a familiar sight in every corner of Jackson County. Blizzards or roads, hip-deep with mud, were never considered reasons for failure to attend his patients. Many times he did not see his children for days on end, leaving before they were up in the morning and returning after they were in bed at night. Only a superb physical equipment made it possible for him to do the prodigious amount of work he accomplished. Nevertheless, Dr. Portmann found time to serve as a member of the council of the Village of Jackson, as Mayor, County Coroner, and President of the School Board.

Three sons, Ursus V. Portmann, now a doctor in Cleveland, Ohio, Milton C. Portmann, now an attorney

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in Cleveland, and Arthur B. Portmann, a sales manager in Cincinnati, Ohio, were graduated from Jackson High School and from Western Reserve University.

Dr. Portmann retired from active practice in 1927. The death of his wife in 1927 was a blow from which he never fully recovered. After his retirement, he visited the families of his sons twice a year and spent his winters at Miami, Florida. He returned to Jackson in the Spring of each year.

Dr. Portmann, who through all of his life had been passionately fond of hunting and fishing, died at the age of seventy-nine on the morning of November 3, 1937, while sitting quietly in his duck blind on Rush Lake, Minnesota. He was buried beside his beloved wife, and among many of those who with him had pioneered the development of Jackson County, in the Riverside Cemetery at Jackson.

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**Martin L. Mayland**  
1868-1937

Dr. M. L. Mayland, a physician for the past forty-four years in Faribault, died November 16, 1937, at Rochester, following a five years' illness.

Dr. Mayland was born in Goodhue County, September 23, 1868. He attended the county public schools and Carleton College and obtained his medical degree from the University of Minnesota in 1892. The following year he took a postgraduate surgical course at the New York Postgraduate School of Medicine and a short course in surgery at McGill University.

After practicing a year at Mankato, Dr. Mayland moved to Faribault, where he played a prominent rôle in the city's civic, political, fraternal and professional life. He had been coroner of Rice County for the past six years. He was instrumental in founding Faribault's first hospital, the city hospital in 1895. He also took an active part in the establishment of St. Lucas Hospital and performed the first operation in both hospitals.

During the World War Dr. Mayland was a member of the Medical Volunteer Service corps and was drafted. He was making preparations to enter active service when the armistice was signed.

Dr. Mayland was a member of the Rice County Medical Society, the Southern Minnesota Medical Association, the Minnesota Medical Association, and the American Medical Association.

During the past twenty-five years, Dr. Mayland had served three terms as county coroner, a position which he held at the time of his death. For several years he was city health officer. He was exalted ruler of Faribault Lodge B.P.O.E. when the present lodge building was erected. He was an active member of the Congregational Church.

On November 30, 1901, Dr. Mayland married Josephine Sullivan, who was at the time superintendent of the city hospital.

Surviving Dr. Mayland in addition to his widow are one son, Martin L. Mayland of Louisville, Kentucky; a brother, Dr. L. L. Mayland of Great Falls, Montana; and two sisters, Anne Mayland of Minneapolis and Mrs. John Dahl of Spokane, Washington.



## ◆ OF GENERAL INTEREST ◆

Dr. M. Weisberg has recently opened offices in New Brighton for the practice of medicine.

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Dr. A. M. Boe has located at Deer River where he will resume the practice of medicine.

\* \* \*

Dr. S. A. Slater, of Worthington, conducted a free chest clinic there on November 10.

\* \* \*

Dr. John Eiler, formerly of St. Bonifacius, has located in Park Rapids for the practice of medicine.

\* \* \*

Dr. A. J. Emond has recently joined his brother Dr. J. S. Emond of Farmington, in the practice of medicine.

\* \* \*

Dr. Paul G. Schmidt, formerly of Cottonwood, has become associated with Dr. M. S. Nelson of Granite Falls.

\* \* \*

Dr. S. B. Haessly, of Faribault, was named a member of the Mineral Springs Sanitarium board at the regular meeting held on November 10.

\* \* \*

Dr. and Mrs. P. F. Holm of Wells, will spend the winter in Florida in their trailer, being located in or near Miami.

\* \* \*

Dr. M. C. Piper was elected president of the Olmsted-Houston-Fillmore-Dodge County Medical Society at a meeting held November 3.

\* \* \*

Dr. W. T. Pearson, formerly of Finlayson, has located in Duluth where he is the examining doctor at the National Optical Company.

\* \* \*

Dr. Archie Arkin, of Winnipeg, has located in Lindstrom, where he is associated with Dr. C. P. Truog in the practice of medicine.

\* \* \*

Dr. M. Brownstone, of Sandstone, and Miss Dorothy Jane Margulies, of Minneapolis, were married in the East Room of the Curtis Hotel in Minneapolis on November 2.

\* \* \*

Dr. F. H. Rollins, of St. Charles, is one of eight Minnesota men given the rank of knight commander of the Court of Honor by the Supreme Council of the 33rd Degree, Ancient and Accepted Scottish Rite of Free Masonry of the southern jurisdiction of the United States at the biennial session at Washington, D. C., in October.

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Dr. S. A. Slater, of Worthington, has been elected president of the Minnesota Public Health Association. Other officers elected were Dr. Russell H. Frost, Wa-

basha, first vice president; Mrs. Eunice L. Rice, Austin, second vice president; N. Vere Sanders, Albert Lea, secretary, and Arthur M. Calvin, Minneapolis, treasurer.

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The Board of Regents of the University of Minnesota established in the past summer in the Department of Surgery a teaching and hospital division of Neurosurgery. Dr. William T. Peyton, Associate Professor of Surgery, has been made Director of the new Division of Surgery. Other members of the staff are: Dr. Arthur A. Zierold, Professor; Dr. J. Frank Corbett, Clinical Professor; Dr. W. P. Ritchie, Clinical Assistant; and Dr. George E. Dunn, Clinical Assistant Professor.

\* \* \*

A number of Minnesota physicians and their wives expect to participate in the seventh inter-American Cruise Congress of the Pan American Medical Association in Havana and the West Indies this winter. The group from Rochester includes Dr. and Mrs. V. S. Counsellor, Dr. and Mrs. W. McK. Craig, Dr. and Mrs. H. Z. Giffin, Dr. and Mrs. F. A. Willius and Dr. and Mrs. H. R. Hartman.

In addition to Havana, stops will be made at Port au Prince, Haiti; Trujillo City, San Domingo, and San Juan, Puerto Rico. Medical sessions will be held at all the ports of call.

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### Navy Medical Corps Examination

An examination of candidates for appointment as Lieutenant (junior grade), in the Medical Corps of the Navy, will be held at all Naval Hospitals in the United States and at the Naval Medical School, Washington, D. C., beginning May 16, 1938.

Candidates for admission must be between the ages of twenty-one and thirty-two years at time of appointment, graduates of Class "A" medical schools, and have completed an internship of one year in a hospital accredited for interns by the American Medical Association and the American College of Surgeons.

Those who are interested should write the Surgeon General, U. S. Navy, Bureau of Medicine and Surgery, Navy Department, Washington, D. C., for further information in regard to the examination and the procedure to follow for them to appear before one of the Examining Boards.

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**Correction.**—Last month we published a news item to the effect that Dr. A. A. Giroux of Duluth had opened offices for practice in Red Lake Falls. Dr. Giroux informs us that the information submitted to MINNESOTA MEDICINE is erroneous and we take this opportunity to correct the error. Dr. Giroux is still located in Duluth at 518 Medical Arts Building.

## OF GENERAL INTEREST

### Dr. E. A. Meyerding Banqueted

Medical, public health and educational leaders from all sections of the state of Minnesota gathered at the Lowry Hotel, Saint Paul, Thursday, November 11, at a surprise testimonial dinner in honor of Dr. E. A. Meyerding, Saint Paul, executive secretary of the Minnesota Public Health Association and secretary of the Minnesota State Medical Association. Dr. Meyerding has devoted more than thirty years to the promotion of public health in Minnesota.

Tribute to the energy, efficiency and ability shown by Dr. Meyerding in his work was paid by a distinguished group of his associates including Dr. J. A. Myers, Minneapolis, president of the National Tuberculosis Association; Dr. A. W. Adson, Rochester, president of the Minnesota State Medical Association; Dr. O. J. Hagen, Moorhead, president of the Minnesota Public Health Association; Dr. C. B. Wright, Minneapolis, trustee of the American Medical Association; Dr. J. M. Hayes, Minneapolis, president-elect of the Minnesota State Medical Association; Dr. E. K. Geer, Saint Paul; Dr. A. T. Laird, Duluth; Mrs. A. L. Sperry, Owatonna, who represented the volunteer Christmas Seal workers of the state. Dr. S. A. Slater, superintendent of Southwestern Minnesota Sanatorium, Worthington, a director of the National Tuberculosis Association, served as toastmaster.

Dr. Meyerding has served as executive secretary of the state Christmas Seal organization for fourteen years, and prior to that time was Director of the Division of Hygiene and Special Classes of the Saint Paul Public Schools for fifteen years. He spent two years in the United States Army Medical Corps in which he is now a Colonel. He has been secretary of the Minnesota State Medical Association since 1925.

\* \* \*

### Christmas Seal Sale

Leaders in the medical profession and in public health work in the nation lend their endorsement to the annual sale of Christmas Seals and the widespread program for better health and against tuberculosis promoted by the funds thus raised.

The 1937 Christmas Seal sale will open Thanksgiving Day throughout the state and nation.

In Minnesota the campaign and the anti-tuberculosis program is carried on by the Minnesota Public Health Association under the leadership of Dr. E. A. Meyerding, executive secretary, and the affiliated county associations.

Dr. Thomas Parran, Surgeon General, United States Public Health Service, has this to say of the Christmas Seal campaign:

"In launching a more intense and specific battle against tuberculosis money as well as strenuous effort will be required. Funds will become available to a considerable extent through the sale of Christmas Seals, now in the 31st year of their usefulness. These Seals, so pleasantly reminiscent of the Christmas season and the winning fight against a ruthless enemy, will, if sold in sufficient quantities, aid measurably in the intelligent direction and actual field activities of skilled fighters against tuberculosis. Despite the

temporary check to our repressive measures I reiterate, 'Tuberculosis can be wiped out in our nation.'"

Dr. J. H. J. Upham, president of the American Medical Association, adds his endorsement of the Christmas Seal. He says:

"Tuberculosis for many years was considered purely a medical question.

"Following the discovery of the tubercle bacillus and the rapidly following information as to its entering places, manner of entrance, the role of reduced resistance by malnutrition, insanitary housing and bad working conditions, its prevention, control and treatment became too great a matter for the medical profession alone.

"The activity of the National Tuberculosis Association in public education leading to prevention, its emphasizing the need of early recognition and treatment, aiding in securing of laws correcting industrial hazards and insanitary living conditions, and especially in fostering the providing of state and community sanatoria, entitles this organization to national recognition and support.

"The Christmas Seal sale is not only a substantial financial aid in this work, but in addition has a wide educational value in keeping the public conscious of the still deadly power of tuberculosis.

"This annual campaign therefore should have the endorsement and support of every good citizen."

In the increased death rate from tuberculosis shown in Minnesota for 1936 is reflected the accumulated results of the years of economic depression, according to Dr. Kendall Emerson, managing director of the National Tuberculosis Association, who reports that twenty-four states in the nation showed an increased rate in 1936.

"By a concentration of effort we hope to start the annual mortality from the disease once more on its downward trend," Dr. Emerson said. "Though the rise in tuberculosis mortality is slight at the moment, it should be taken as a call to arms. The people of the country should give every aid to push back this ruthless enemy before it has regained an appreciable amount of the ground from which it has been forced to retreat."

### ORAL VACCINE IN THE "COLD" SEASON

During the winter of 1936-1937 Eli Lilly & Co. strenuously advocated the treatment of colds with an oral vaccine, Entoral. Since colds are generally self limiting, scientific evidence on the value of any preparation is hard to obtain. The Council on Pharmacy and Chemistry considered Entoral and declared it unacceptable for inclusion in New and Non-official Remedies because the hypothesis on which the product is based is inadequately supported by experimental evidence and the reports of its use contained in the literature are insufficiently documented. Now the William S. Merrell Company has been circularizing the profession with claims broader and more bombastic than those made for Entoral. Its product is Catarrhal Oravax-Merrell, described as catarrhal vaccine in enteric coated tablet form. The firm claims that "by the use of Catarrhal Oravax it is now possible to immunize large industrial groups against common cold at extremely low cost." Has any competent industrial surgeon actually established the usefulness of this preparation? Recent advertising mentions only experiments on Merrell's own employees! (J. A. M. A., Oct. 2, 1937, p. 1130.)

## REPORTS and ANNOUNCEMENTS

### MEDICAL BROADCAST FOR DECEMBER

The Minnesota State Medical Association Morning Health Service.

The Minnesota State Medical Association broadcasts weekly at 9:45 o'clock every Saturday morning over Station WCCO, Minneapolis and Saint Paul (810 kilocycles or 370.2 meters).

*Speaker:* William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota. The program for the month will be as follows:

- December 4—Nasal Obstruction.
- December 11—Typhoid Fever.
- December 18—Tuberculosis.

### SCIENTIFIC EXHIBIT—A.M.A.

Application blanks are now available for space in the Scientific Exhibit at the San Francisco Session of the American Medical Association, June 13-17, 1938. The Committee on Scientific Exhibit requires that all applicants fill out the regular forms.

Application blanks may be obtained from the Director, Scientific Exhibit, American Medical Association, 535 North Dearborn Street, Chicago, Illinois.

### AMERICAN PUBLIC HEALTH ASSOCIATION

The sixty-sixth annual meeting of the Association, held in New York City, October 5-8, 1937, proved to be the largest meeting in the Association's history. The registration was 3,549.

Dr. Arthur T. McCormack was inducted into the office of president and Dr. Abel Wolman of Baltimore was named president-elect.

The 1938 meeting will be held in Kansas City.

### AMERICAN MEDICAL GOLFERS

A "Golfers Special" to the San Francisco meeting of the A.M.A. is being organized by the American Medical Golfing Association. Physicians who like golf mixed with their travel will find five games arranged on the trip out to the coast for the A.M.A. meeting of June 13, 14, 15, 16 and 17, 1938, and three games on the return trip through the Northwest. The first game will be played in New Orleans, reached by the Steamship S.S. Dixie, from New York (or via a rail itinerary) on Tuesday, June 7, 1938. Other stops include Houston, Galveston and San Antonio, Texas; Los Angeles and Del Monte, California; and finally San Francisco where the big A.M.G.A. tourney will be held on Monday, June 13, 1938.

The return trip includes Portland, Oregon; Seattle, Washington; Vancouver, B. C.; Lake Louise and Banff, and finally St. Paul and Chicago.

Non-golfers as well as golfers, and their ladies, are

WELCOME and will find the A.M.G.A. Special a glorious experience.

For full particulars write Dr. Walt P. Conaway, 1723 Pacific Avenue, Atlantic City, N. J., the President of the A.M.G.A.; or Bill Burns, Executive Secretary, 2020 Olds Tower, Lansing, Michigan.

### MISSISSIPPI VALLEY MEDICAL SOCIETY AWARD

The Mississippi Valley Medical Society offers a cash prize of \$100.00, a gold medal and a certificate of award for the best unpublished essay on a subject of interest and practical value to the general practitioner of medicine. Entrants must be ethical licensed physicians, residents of the United States and graduates of approved medical schools. The winner will be invited to present his contribution before the next annual meeting of the Mississippi Valley Medical Society (September 28, 29, 30, 1938), the Society reserving the exclusive right to first publish the essay in its official publication—the *Radiologic Review and Mississippi Valley Medical Journal*. All contributions shall not exceed 5,000 words be typewritten in English in manuscript form, submitted in five copies, and must be received not later than May 15, 1938. Further details may be secured from Harold Swanberg, M.D., Secretary Mississippi Valley Medical Society, 209-224 W.C.U Building, Quincy, Ill.

### STATE MEETING

A program prepared with a special emphasis on practical therapeutics is now taking final shape, according to the Committee on Scientific Assembly for the 85th annual meeting to be held in Duluth, June 29, 30 and July 1, 1938.

Only a few details remain to be decided upon for the meeting sections and already three of the distinguished out-of-state guest speakers have definitely accepted invitations to speak.

Most of one morning's sessions will be devoted to clinics in the Duluth hospitals. All other sessions will be held in the ballroom of the hotel with scientific exhibits and demonstrations and technical exhibits surrounding them on the meeting floor and the mezzanine below.

Scientific exhibits and demonstrations will continue to be an especial feature of the meeting as they have in the past and every effort is being exerted to make them practical, stimulating and representative of medical research in Minnesota.

Within a few days after sale of technical exhibit space was opened, all technical exhibit space on the meeting floor had been reserved, and reservations are already coming in tentatively for additional space which

## WOMAN'S AUXILIARY

will be opened to take care of the overflow on the mezzanine floor. Mezzanine space will also be used for registration and for scientific exhibits and demonstrations and members are especially urged to call this new opportunity to the attention of representatives of desirable firms who call upon them.

Following is the list of exhibitors who were so prompt in seizing the opportunity to take advantage of the Duluth meeting:

Abbott Laboratories, North Chicago, Illinois  
A. S. Aloe Company, St. Louis, Missouri  
C. F. Anderson Co., Inc., Minneapolis, Minnesota  
Ayerst McKenna and Harrison, Montreal, Quebec, Canada  
Brown and Day, Inc., St. Paul, Minnesota  
The DeVilbiss Company, Toledo, Ohio  
General Electric X-Ray Corporation, Minneapolis, Minnesota  
Horlick's Malted Milk Corporation, Racine, Wisconsin  
Killogg Company, Battle Creek, Michigan  
Mead Johnson and Company, Evansville, Indiana  
The William S. Merrell Company, Reading, Ohio  
C. V. Mosby Company, St. Louis, Missouri  
Pengelly X-Ray Company, Minneapolis, Minnesota  
Petrolager Laboratories, Chicago, Illinois  
Philip Morris and Company, Ltd., Inc., New York, New York  
Physicians and Hospitals Supply Co., Minneapolis, Minnesota  
W. B. Saunders Company, Philadelphia, Pennsylvania  
Schering Corporation, Bloomfield, New Jersey  
E. R. Squibb and Sons, New York, New York  
U. S. Hospital Supply Company, Minneapolis, Minnesota  
John Wyeth & Bros., Inc., Philadelphia, Pennsylvania

### MINNESOTA SOCIETY OF INTERNAL MEDICINE

The semi-annual meeting of the Minnesota Society of Internal Medicine was held in Saint Paul November 8, 1937, with the president, Dr. George B. Eusterman, presiding. Dr. Charles N. Hensel was elected president for the ensuing year and Dr. Moses Barron, vice president. Dr. Max Hoffman was re-elected secretary and treasurer. Following dinner at the Town and Country Club, the members heard an interesting address by Mr. Arthur Koehler of the University of Wisconsin on "Wood in Crime Detection, with Particular Reference to the Lindbergh Case."

### INJECTION TREATMENT OF HERNIA

The injection method, according to its modern advocates, is applicable only to hernias that can be completely reduced and kept reduced by means of a truss. Its use is contraindicated in irreducible hernias, in sliding hernias and in the presence of an undescended testis. Injections are further contraindicated in the presence of superficial skin infections or erosions caused by the truss, in syphilis, diabetes, senility or marked emaciation. Hernias with a wide ring are not likely to give a good result. The case best suited for the treatment is the small, reducible, indirect inguinal hernia in a young person. The complicated hernias and the large hernias of the middle aged and the elderly are the least suited for the injection treatment. Anatomic conditions in a direct hernia, in the umbilical and the femoral hernia, make the injection treatment undesirable, in the opinion of many. Although in the hands of some investigators the results seem to have been good, the complications, the difficulty in selecting suitable cases, and the still uncertain percentage of recurrences would seem to make the method unsuitable except under circumstances in which unusually careful technic and suitable care are possible. (J. A. M. A., Oct. 30, 1937, p. 1456.)

## WOMAN'S AUXILIARY

Mrs. J. F. Norman, Crookston, *President*  
Mrs. A. A. Passer, Olivia, *Editor*

### Ramsey County

At the first general fall meeting held in the Ramsey County Medical rooms of the Lowry Medical Arts building a talk was given by John Nyloff of Holm and Olson on the "Care and Arrangement of Flowers."

An outline for the year's activities was prepared at the morning board meeting at the Woman's City club. Mrs. E. H. Bohland, president, presided.

A series of six reviews of current Broadway plays will be presented under the auspices of the Ramsey County Medical Auxiliary at 10:30 A.M., Tuesdays, in the library of the Medical Society in the Lowry building. Mrs. Arthur A. Stewart will give the reviews.

Members of the Ramsey County Auxiliary meet twice a month in the children's hospital, 311 Pleasant Avenue, to sew for the hospital. The group works under the direction of Mrs. H. T. Nippert, chairman of the philanthropic committee.

### Park Region

The regular October meeting of the Auxiliary was held at the home of the president, Mrs. W. L. Burnap, Fergus Falls.

The Auxiliary voted to place *Hygeia* in all senior high schools in this district, which includes four counties, Otter Tail, Wilkin, Douglas and Grant. It will again sponsor the annual Christmas seal high school radio contest. Besides other awards winners will be given a trip to Minneapolis to broadcast their essays. Mrs. Martin Nordland, Minneapolis, past state president, was a guest at this meeting.

### Kandiyohi-Swift Meeker Counties

The November meeting of the Auxiliary was held at the home of the president, Mrs. H. Hutchinson of Willmar. Miss Ward, public health nurse of Kandiyohi county, was the speaker.

### Renville County

Regular meetings of the Renville County auxiliary are held the first Tuesday evening of each month at the high school. The December meeting was a Christmas party. It was voted to sponsor again the annual Christmas seal high school radio contest. Mrs. Ralph Adams of Bird Island is president of this group.

### St. Louis County

Mrs. Malcolm G. Gillespie, Duluth, president of the St. Louis County Auxiliary, was in charge of arrangements for a rummage sale held by that group in November. Mrs. P. S. Rudie was hostess to the members at their annual Thanksgiving luncheon. Regular meetings of the Auxiliary are held the second Tuesday of each month at 1:00 P.M.

## TRANSACTIONS OF THE MINNEAPOLIS SURGICAL SOCIETY

Meeting of October 7, 1937

The stated meeting of the Minneapolis Surgical Society was held Thursday, October 7, 1937, the president, Dr. O. W. Yoerg, in the chair.

The following papers were presented:

### TREATMENT OF FRACTURE OF THE PATELLA BY REMOVAL OF THE PATELLA

R. C. WEBB, M.D.

#### Case Report

DURING this year I have operated upon three patients with fracture of the patella which was unusually severe and out of the ordinary.

**Case 1.**—In the first case, a man, aged forty-five, had a very markedly comminuted fracture of the left patella, with marked separation of the fragments. He was operated upon on January 27, 1937, five days after injury, and the major fragments were drilled and approximated with catgut after suturing the tears in the joint capsule. The fragments were still loose, however, and a purse string of heavy braided silk was passed around the patella at the ligamentous attachments in order to preserve the normal size of the patella. After operation the extremity was kept quiet for four weeks because of the extensive comminution. He was then allowed to move the knee more and more. He steadily improved, but his progress was slow and he had considerable pain in his knee. Three months after operation he was x-rayed by Dr. Allison, and he reported the fragments firmly united in excellent position. Four months after injury he could flex his knee beyond a right angle to seventy degrees, and he could walk normally. His knee cap was still sore, and the knee would become sore if it was kept in one position too long. His knee would become painful when driving an automobile a few miles. He returned to work as a locomotive fireman four and one-half months after injury.

**Case 2.**—The second case was very similar in that there was an extensively comminuted fracture of the patella with separation of the fragments following an automobile collision. The patient was a man forty-seven years of age who was operated upon in an out-of-town hospital on April 20, 1937, nine days after injury. The lateral capsule was sutured with chromic catgut and two of the largest fragments were drilled and approximated with bronze wire. Two months later he came in for examination. He could extend his knee normally but could flex it only 145 degrees. He continued to improve, and four months after injury he could flex his knee to 90 degrees. He complained of pain across the front of his knee, and at times the pain awakened him at night. It always took him a few minutes to get his knee limbered up when he started to walk. He had been able to work at shocking grain, however, on one occasion, three months after injury. X-ray examination showed the fragments in close approximation. In general, I believe he should be classed as a fairly satisfactory result.

In each of the two above cases with extensive comminution of the patella and tearing of the lateral capsule of the joint, successful effort was made to recon-

struct the patella and obtain a sufficiently strong knee to enable the men to work, in one case as a locomotive fireman and in the second case as a garage worker. The disability was five months in one case and three months in the other. Both men still had complaints in connection with their knees after they returned to work.

At the last previous meeting of this society, Dr. Kenneth Bulkley called attention to the report by Dr. Lister in the *British Medical Journal* of the first operation on a fractured patella in 1877, just sixty years ago. During these sixty years there have been numerous methods published for treatment of the patella itself. All agree on the importance of suturing the tear in the capsule, but they differ in methods of treating the patella. When the fragments fit together snugly after suturing the capsule, some writers advocate no further effort to hold the bone fragments in place.

Usually, however, the writers are apprehensive as to the stability of the fragments, and as they desire early motion, they advocate fixation of the patellar fragments by drilling and fastening them together with various forms of suture material, including wires, fascia and also bone grafts. I think I have used nearly all of the different methods except bone graft, and the results have all been reasonably satisfactory with the exception that the patients do have some joint symptoms, and the disability is variably prolonged depending upon the patient's occupation. Like many others I am interested in any more promising methods.

In the *British Journal of Surgery* in April, 1937, just sixty years after Lister's first report on fracture of the patella, R. Brooke of the Royal West Sussex Hospital, Chichester, advocated the excision of the patella when fractured. He presented a series of thirty cases treated in this manner since 1930. His results were definitely startling and were substantiated by a brief statement by Sir Ernest W. Hey Groves.

**Case 3.**—My third patient was an Armenian laborer in his late forties. He had sustained a fracture of the patella sixteen days before operation and fifteen days before admission to the hospital. The fracture was transverse and the fragments were separated about one inch as shown in the x-ray. In view of the time elapsed since injury I felt that with the usual type of operation combined with the ordinary period of immobilization after operation there would be a prolonged period of disability and possibly some permanent limitation of motion in the knee joint. At operation the joint was exposed with a curved incision. The patellar fragments were easily shelled out of their aponeurotic covering, the joint was irrigated with normal saline and the quadriceps tendon was sutured with a strip of fascia lata reinforced with interrupted catgut sutures. The skin was closed with fine dermal and a dressing was applied.

No splints were applied. He was returned to bed, and he was allowed to move the knee joint and was

## TRANSACTIONS MINNEAPOLIS SURGICAL SOCIETY

encouraged to do so. The wound was healed at the end of a week and he was allowed up in a chair. At the end of ten days he was walking. The lantern slide shows photographs of him taken on the thirteenth day after operation. He is seen sitting with his

the most important part of the operation of repair and when the fragments of the fractured patella are removed a more close and firm repair can be made.

### Discussion

**DR. S. H. BAXTER:** Is there any material change in the appearance of the knee that would be noticeable afterward?

**DR. R. F. McGANDY:** I would like to ask Dr. Webb whether or not this patient experienced pain when kneeling on his knee following this procedure?

**DR. JAMES A. JOHNSON:** Dr. Webb's presentation of treatment of fracture of the patella was certainly a very interesting and new method. I have never employed it. The patella is not subject to many diseases for which it has to be removed. It occasionally, however, becomes involved with tuberculosis, which has a tendency to become chronic and destroy it.

Many years ago I saw two such cases in which it became necessary to remove the patella completely. Both of these individuals had good results with perfect function of the knee joints. It was not a difficult thing to do and in cases in which there is extreme fragmentation of the patella it would seem to me a logical procedure.

**DR. A. W. ING** (by invitation): I saw a young boy not long ago with a congenital absence of the patella. There was very considerable disability resulting from this defect. One might hesitate in doing a complete removal of the patella because of the possibility of resulting disability, although apparently this risk is small.

The operation that Dr. Webb describes is very interesting and no doubt would be useful in some cases. His description suggested the possibility of a partial removal of the patella as described by Blodgett and Fairchild.

I am very sure that these suggestions, both complete and partial removal of the patella, will be very helpful in the treatment of this injury.

**DR. WILLARD WHITE:** When an individual breaks his patella the so-called capsule or fascia is torn so that the extensor tendon from the rectus femoris muscle can no longer act to extend the leg. It has been demonstrated that integrity of the extensor tendon is the important factor in fractures of the patella and whether or not the fragments have united with firm bony union is relatively unimportant if the fascia and tendon have healed firmly following their suture. Dr. Webb now demonstrates that it is possible to allow a person to return to work in three or four weeks after the removal of the patella. Does it not naturally follow then that a man could return to the same active use of his leg in three or four weeks if the tendon and fascia are repaired even though the patella itself has not yet firmly healed? I believe that it does.

**DR. E. C. ROBITSHEK:** I should like to call the attention of the members to an uncommon form of fracture of the patella, a type probably occurring sometime in the practice of each of us, but also probably unrecognized by us. Under the title of "A Hitherto Undescribed Fracture of the Patella," D. M. Meekison of Vancouver, Canada, in the *British Journal of Surgery*, Vol. XXV, No. 97, July, 1937, describes his 3 cases with reports of each. I will show you a slide taken from a picture, in this article, illustrating the patella with a patch of bare bone on the articular surface and the separated fragment. (Shows slide.)

Meekison summarizes his article as follows:

The mechanism seems to be a rather severe injury, in the main consisting of a glancing blow on the patella from the inner side and directed obliquely posteriorly, whereby the inferior and medial corner of the articular



Fig. 1. Photograph of patient with fracture of the patella showing the left knee thirteen days after removal of the patella. The patient was able to extend the knee normally and walk without support and flex the knee as shown here.

knee flexed to less than a right angle to about 75 degrees (Figure 1). At this time he could have returned to any light occupation. He was advised not to return to heavy work, however, until two months after operation in order to allow firm healing of the sutured quadriceps tendon.

Brooke calls attention to the fact that the patella develops behind the quadriceps tendon and not in the tendon and that its development is not in response to a functional need. In the human, the patella is relatively smaller in the adult than in the child. In slow-moving animals the patella is proportionately large, while in rapidly moving animals the patella is relatively small, and the kangaroo with an enormous quadriceps has no patella. Brooke feels that the patella really has a deterrent action on a machine for which it was never designed. In animals now extinct it is relatively larger than in younger members of the same family.

In Brooke's cases he emphasized the rapid and complete recovery of function and ability of laboring men to return to full work within four to six weeks after operation. In ten cases in which he tested the strength of the knee extension, he found that in nine of the cases the leg from which the patella had been removed was the stronger.

Brooke's paper was followed by a brief note by Hey Groves in which he said his first reaction was one of frank incredulity. After examining eight of his cases, however, he found that Brooke's claim was fully justified. The quadriceps tendon merely passes over the patella and the upper and lower margins of the patella are covered with fat and give no attachments to any ligamentous fibers. It is the suture of the lateral expansions of the quadriceps tendon which is

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surface is knocked out, presumably by the lateral condyle of the femur.

The loose fragment is always found in the lateral pouch, can be palpated and is tender.

X-ray examination, with present technic, does not reveal this fracture.

Convalescence is always prolonged, with the prospect of some slight permanent disability.

The only treatment so far seems to be arthroscopy, repair of the quadriceps expansion, inspection of the fibrocartilage, and removal of the fragment.

DR. R. C. WEBB: There is very little change in the appearance of the knee. The patient is apt not to miss the patella, and when the knee was shown, the examiners were apt not to miss the patella. Although this patient could neither read nor write, he was a very intelligent man who spends his summers in the Rocky Mountains in Montana, and his winters in California. He is now in California, but I have no way of knowing whether he is working in California. Several doctors, including Dr. Yoerg, saw him before he left the hospital at Minneapolis and they agreed that he could return to light work three weeks after the operation.

We all appreciate the value of early motion in fractures of the patella, and we know the dangers of too long immobilization. As a result of my study of Brooke's contribution and my experience with this patient, I am sure that the results in compound fractures of the patella and in certain other cases of fractures of the patella can be improved by excision of the patella and closure of the quadriceps tendon.

### TOTAL LEFT PNEUMONECTOMY FOR PRIMARY BRONCHOGENIC CARCINOMA

#### Case Report

THOMAS J. KINSELLA, M.D.

I AM very sorry that my patient was unable to appear before you this evening but a slight indisposition, unrelated to the present illness, prevented him from making the automobile trip to the city for this meeting.

This man, sixty-one years of age, a hotel keeper and former railroad conductor, first consulted me on June 21, 1937, referred by Dr. E. E. Carpenter of Superior, Wisconsin, because of cough, fever, and loss of weight. He had apparently been perfectly well until the middle of December, 1936, when he developed an acute tonsillitis followed by an arthritis of the right great toe which persisted for two weeks. With this tonsillitis he had a fever to 101 degrees and cough and expectoration of colorless mucoid material amounting to one-half ounce in twenty-four hours. When the acute process subsided, cough and expectoration of clear mucous and slight dyspnea without wheezing persisted. His chest was negative to physical and fluoroscopic examination on January 20, 1937. The cough and expectoration without blood or pus continued with increasing loss of strength and weight which by April totaled twenty-three pounds. X-ray examination at this time revealed an infiltration about the hilum of the left lung. After a period of four weeks treatment at a rest home, he was transferred to the Middle River Sanatorium at Superior, where he remained until June 20, 1937. The cough expectoration and weight loss continued in spite of bed rest until he had lost a total of thirty-three pounds in a period of six months. Repeated sputum examinations by smear and guinea pig inoculations were negative for mycobacterium tuberculosis.

My examination revealed a large, well developed man presenting evidence of marked weight loss. He was troubled by a frequent slight cough with expectoration of clear mucoid material. Physical examination revealed obstructive emphysema of the left upper lobe and roentgen examination showed an increased infiltration in the left lung as compared with one month previously. Bronchoscopic examination by Dr. L. R. Boies revealed mucoid secretion coming from the upper lobe bronchus but no tumor mass. A diagnosis of obstruction of the left upper lobe bronchus probably due to malignant tumor without evidence of metastasis was made and exploration recommended. A complete x-ray study of the gastro-intestinal tract revealed no evidence of new growth.

The patient was admitted to Northwestern Hospital on July 7, 1937, and left pneumothorax induced as a preliminary to thoracotomy. This was continued for a period of ten days and a 50 per cent collapse of the lung obtained. Bronchoscopic examination was repeated in the hope of visualizing a tumor in the upper lobe bronchus and obtaining a biopsy to establish the diagnosis but again there was no mass to be seen. The obstruction of the upper lobe bronchus persisted and the patient continued to run a mild septic type of temperature from secondary infection in the obstructive lobe.

On July 20, 1937, under intra-tracheal cyclopropane anesthesia, administered by Dr. Ralph T. Knight with the patient lying on his back, the left pleural cavity was opened by long transverse incision through the third interspace anteriorly without resection of the rib but with a parasternal section of the third and fourth cartilages and the incision widened by means of a rib spreader. Extensive adhesions encountered anteriorly and medially were divided and a total left pneumonectomy performed according to the Rienhoff technic. The mediastinal pleura was opened and the left pulmonary artery and veins doubly ligated and sectioned in sequence. The left main bronchus was divided, without crushing, about fifteen millimeters from the carina and after section of the cartilages at two points was closed with interrupted silk sutures. The bronchial stump was allowed to retract into the mediastinum and the mediastinal pleura closed over it. The chasm incision was then closed tightly without drainage. Intravenous fluid and blood were given during the operation as a precautionary measure but the procedure as a whole was well tolerated and the patient left the operating table with his skin warm, dry and pink and a pulse of 84, respiration of 20, and blood pressure, 124/80. The excised lung revealed a squamous cell carcinoma, which almost completely obliterated the upper lobe bronchus without any projection into the stem bronchus. There was considerable secondary pneumonitis and bronchiectasis distal to the tumor mass. The patient's postoperative condition was relatively uneventful. He remained in an oxygen tent for twenty-four hours and was then removed as there was no evidence of anoxemia. The left pleural cavity rapidly filled with fluid which was not disturbed as no pressure symptoms developed. Subsequent aspiration two weeks after the operation revealed a straw colored clear fluid with a cell count of 200 per cubic millimeter. The wound healed by primary intention, the patient was permitted to get out of bed at the end of two weeks and walked out of the hospital at the end of the fifth week in good condition. His subsequent course has been uneventful. A detailed report will be published at a later date. To our knowledge, this is the first successful total pneumonectomy performed in the state of Minnesota.

#### Discussion

DR. RALPH T. KNIGHT: This type of operation presents an interesting problem to the anesthetist. The function of the anesthetist, of course, in any procedure,

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is to obliterate the function of whatever part of the nervous system it is necessary to put under control, in order that the operation may be done without pain to the patient or impediment to the surgeon. In case of general anesthesia that is most true. The anesthetist is carrying the patient down toward the realms of death, keeping him there and bringing him back. The particular troubles that enter into anesthesia for this sort of operation occur, of course, because the mechanism of the operation interferes with the mechanism of respiration. One of the difficulties in doing an operation of this kind is the interference with the surgical procedure by the heaving motion of the mediastinum which is apt to take place in the effort of the opposite lung to carry on enough ventilation. The respiration must be controlled in some way during anesthesia so that it is kept as quiet as possible and yet that enough effective ventilation is carried on to keep the patient in good condition. The first requisite is answered by inserting a tracheal tube to avoid any possible interference with the passage of gas in and out of the lung. This should be a fairly large and snug tube so that the gas will not escape and so that if necessary, one can control the ventilation by gentle pressure on the bag. In case of total pneumonectomy one doesn't need, and, in fact, one doesn't want a positive pressure, yet there must be perfect control of pressure during the whole procedure. At the time the bronchus is opened it is especially necessary not to have a positive pressure in order that material from the bronchus will not be forced out into the pleural cavity.

In seeking a way to reduce the motion and have as quiet breathing as possible, of course, the question of the agent that is used as an anesthetic is especially uppermost in one's mind. This question is answered very nicely by the use of cyclopropane which allows the administration of a very large proportion of oxygen and therefore allows of perfect oxygenation of the patient with very little ventilation and the necessary motion to go with it.

This patient was anesthetized with cyclopropane. About 5 c.c. of ether was also given in addition to get just enough relaxation to obliterate the throat reflex as well as possible and so to permit easy introduction of the tube. The pharynx was packed to give as tightly closed respiratory circuit as possible. The anesthesia from that point on was carried on with cyclopropane alone. In cases where there is drainage from the lung that is to be removed, the best procedure is to insert the tube not into the trachea but into the bronchus of the opposite lung. That should be sealed off with a balloon around the tube in the bronchus so as to prevent aspiration, into the good lung, of material which is pressed out of the lung which is being removed. The connections of the tracheal tube set-up should be such as to permit easily the use of a suction catheter and that is what was done in this case. We had a specially designed connection between the tracheal tube and the gas machine, devised by Dr. Chas. Adams, so it was easy to insert a catheter down through the tracheal tube and we frequently aspirated whatever secretion there was in the trachea.

The patient remained in very good color and in good condition all the way through. It happens sometimes that at the time of crushing the bronchus there is a considerable vagus reflex which may lower the patient's blood pressure alarmingly just for a brief space of time. It didn't this time. We kept the the blood pressure within five or ten points of normal all the time with fluids and blood. The patient went off the table with a blood pressure of 115/75—practically what it was when he went on the table. He was awake by the time he reached his room downstairs.

DR. E. T. BELL (by invitation): My main purpose in being here is to prove that Dr. Kinsella did take

out a lung and that the growth is a carcinoma. There is an ulcerative tumor which obstructs the main bronchus of the left upper lobe. Microscopically it is squamous cell carcinoma.

I am impressed with Dr. Kinsella's modest presentation of a difficult surgical operation. This operation offers us a little hope for a disease that is otherwise 100 per cent fatal. There are many carcinomas of the lung. There are many who think that the increase of carcinoma of the lung is only apparent and that it is due to greater accuracy in clinical and pathological diagnosis, but the European pathological laboratories have all noted this increase, and they have been performing a large number of postmortems for many years. No satisfactory explanation for the greater frequency of carcinoma of the lung has been offered. It may be due in part to the increasing percentage of old people in the population. There are now many more persons over fifty years of age than there were fifty years ago. The majority of pulmonary carcinomas arise near the hilus of the lung, and the surgeon is therefore obliged to remove the entire lung in most instances.

Distant metastases do not form early in the course of carcinoma of the lung but we do not have data as to the frequency of early involvement of the bronchial nodes. It is clearly important to establish the diagnosis as early as possible. Usually this may be done by bronchoscopic examination and biopsy. As to the microscopic structure, somewhat less than one-half of the carcinomas are of the squamous cell type. The others are adenocarcinoma and small cell carcinoma.

DR. OWEN H. WANGENSTEEN: In 1868 Samuel D. Gross visited the surgical clinic of Professor Billroth in Vienna, and upon his return related what heroic operations he had seen Billroth do. What this courageous surgeon might next do, Gross said, would be difficult to foretell—possibly the extirpation of the liver or the stomach. Gross lived long enough to hear of the first successful resection of the stomach for cancer by Billroth in 1881. What Gross would think of some of the modern accomplishments of surgery would be interesting to know.

Dr. Kinsella's case of successful extirpation of the lung for cancer undoubtedly would excite his admiration. In meetings of the American Society for Thoracic Surgery, a favorite subject of discussion for years has been operative attack upon the lung for cancer. As long ago as 1917, Lilienthal removed an entire lung successfully for bronchiectasis. It was not until 1933, however, that Evarts Graham had the first success with complete removal of a lung for malignancy. Graham employed the classical posterior approach. Not long after, Rienhoff reported two successes in which he had removed an entire lung through an intercostal muscle incision, employing an approach through the anterior chest wall. Some of the advantages of this method are immediately apparent: there is less trauma and direct access is had upon the pulmonary vessels. At the meeting of the Thoracic Society in May of this year Rienhoff reported several successful instances in which he had divided the operation of pneumonectomy into two stages ligating the pulmonary artery at the first operation; about ten days later the lung was removed.

My associate, Dr. Herbert A. Carlson and I have recently had an experience with pneumonectomy which I should like to discuss briefly. Dr. Carlson will relate the essentials of the case history and findings. It was my plan to employ Rienhoff's proposal of preliminary ligation of the pulmonary artery. Despite the employment of preliminary pneumothorax, the lung was so adherent especially on its hilar surface that by the time the pulmonary artery was uncovered, the major portion of the operation had been done. It was there-

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fore deemed best to complete the operative procedure in one sitting. The entire operation lasted two hours and fifteen minutes, of which one hour was concerned in opening the chest and gaining access to the pulmonary root. The pulmonary vessels and bronchus were dealt with in the same manner as Dr. Kinsella described. My case like his concerned the left lung. The patient stood the operative procedure nicely (operation, October 1) and has done well. The highest postoperative temperature was 102.2° F. (rectal temperature) seventy-two hours after operation. The chest was closed tightly with silk ligatures and no drainage was employed. The chest has been aspirated with a needle on a few occasions. When the proof sheets of these notes were reviewed (October 22) the patient's wounds had healed by first intention. Whether the ribs on the left side will have to be removed is not yet apparent.

There are two points bearing upon the operation of pneumonectomy which I would like to mention.

1. By extending and abducting the arm and retracting the latissimus dorsi and teres major muscles with a deep retractor, the wider exposure of the posterior incision is to be gained for the anterior operation. I employed the anterior approach of Rienhoff, making the incision in the second intercostal space. By retracting the flat muscles of the lateral chest wall, I found it easy to extend the incision in the intercostal space, well posteriorly toward the spine. The second, third, fourth, and fifth costal cartilages were divided and a short segment of the rib removed. A self retaining mechanical rib spreader was not necessary. The retraction of the latissimus dorsi and teres major muscles and the posterior extension of the intercostal incision (the patient lying with the operated side tilted up somewhat) afforded surprisingly adequate and satisfactory exposure. I have heard a few surgeons who have done pneumonectomy through an anterior incision say that they would never attempt it again save through the freer though more difficult posterior approach. I believe that the retraction of the lateral flat muscles of the chest wall, here described, will materially facilitate the operation of pneumonectomy by the anterior approach.

2. The matter of dealing with the thorax on the side from which the lung was removed has not yet been definitely settled. In his case Graham did a primary resection of the ribs overlying the operative field. Rienhoff insisted that the organization of the fluid on the operated side, filled the chest and made rib resection unnecessary. Both authors have receded somewhat from their initial stands with reference to this point. As a matter of fact, Graham now supports Rienhoff's initial contention and Rienhoff inclines to the belief that Graham's advocacy of rib removal will be necessary in a number of cases. In instances of pneumonectomy in which persistence of fever indicates the necessity for external drainage and rib removal, extensive rib removal can be accomplished to establish collapse of the chest wall in a very simple way. This method of rib removal I have employed since May of this year in a number of cases of empyema as well as thoracoplasty for tuberculosis. Its performance takes into consideration the direction of insertion of the intercostal muscle bundles. Through a short transverse anterior incision, the rib is cut near the sternum, removing the cartilage in instances of thoracoplasty for tuberculosis. The periosteotome is then pushed along the lower border of the rib, and with elevation of the muscles of the chest wall upon a deep retractor with a narrow blade inserted in the intercostal space, the stripper can be pushed as far posteriorly as the angle of the rib. Three or four ribs are divided anteriorly and dealt with in this fashion. In chronic

empyema, I have divided as many as ten ribs through three short transverse incisions. About a week later through a short vertical incision beside the spine, the same ribs are divided and the intercostal muscle bundles are separated off from the superior border of the rib. With traction upon the rib and a gentle pushing motion with a sponge mounted on a long hemostat, the entire rib is pulled usually with ease through the posterior incision. One great advantage of this method in extensive chronic empyemas is that the thickened parietal pleura need not be excised.

DR. HERBERT A. CARLSON (by invitation): Five years ago I wrote a paper with Dr. Harry Ballou of Montreal on the "Operability of Carcinoma of the Lung." The work was done at Barnes Hospital in St. Louis and it was a very discouraging outlook at that time. It was discouraging for two reasons, one was that the operative work that had been done had been almost entirely unsuccessful. There were only five cases reported in the literature in which the patient had lived more than one year after operation. The other reason it was discouraging was that the autopsy material revealed that most cases at the time of death show wide spread metastasis. There were two cases in which at autopsy no evidence of metastasis, either regional or distant, could be found. When we took this work and showed it to Dr. Graham we were a little surprised that he was so enthusiastic about it. The following April he had a patient, a doctor, with carcinoma of the lung in which he could demonstrate no metastasis. He went ahead and did a total pneumonectomy and as far as I know that was the first successful pneumonectomy for carcinoma of the lung.

Since that time I think I have seen all the cases of carcinoma of the lung which have come to the University Hospital. I cannot say how many there have been but in a four and one-half year period I have seen quite a number and until recently we had not seen a single case which we thought was suitable for exploration. However, we have one patient who came in a few weeks ago presenting a history of pain in the chest since March of this year. At the onset that was his only symptom and he really has had very few symptoms of any kind since. He has had a little loss in weight and a little weakness, no cough, no expectoration, no hemoptysis. We gave him the benefits of gastro-intestinal x-ray, and an intravenous pyelogram, and found no evidence of any other primary carcinoma. Bronchoscopy showed no evidence of any tumor. However, the x-ray picture is characteristic of carcinoma of the lung and the lipiodol filling is practically pathognomonic. There is an obstruction in the anterior inferior branch of the left upper bronchus. We gave him pneumothorax but because of the presence of adhesions it was not possible to collapse the lung as much as one would like. Bronchoscopic examination was repeated after pneumothorax but no tumor could be seen. However, on the basis of x-ray evidence we proceeded and Dr. Wangensteen performed the operation which he described. The entire left lung was removed. The ultimate picture is as you see it here; this operation was performed on October 1st, six days ago. He has fluid on the left, the mediastinum has been pushed over some and for that reason some of the fluid has been aspirated occasionally, but no attempt has been made to remove all of it. The temperature has gone up as high as 102.2 the second day, the pulse has never gone up over 90. His temperature today was 100. As a matter of fact, he had a temperature that high before the operation. He has fibrillation and it has also been noted that changes in position result in considerable change in his blood pressure. If he turns on his back or a little to the right he develops a drop in blood pressure.

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### THE SURGICAL MANAGEMENT OF DIVERTICULUM OF THE BLADDER

T. L. CHAPMAN, M.D.  
Duluth

(by invitation)

THE purpose of this article is to reconsider the methods of surgical procedure advocated for diverticula of the urinary bladder, and to set forward some features of operative technic that are not generally employed, that may add something to the safety of the patient as well as satisfaction to the surgeon.

The locations in the bladder from which diverticula may arise are so varied that many types of approach must be employed. It has been fairly well determined by many excellent studies in the etiology of the disease that it does have necessarily, as an original background, structural defect in the organ. The presence of this imperfection may not result in the formation of a diverticulum, although it may occur, but in general, those usually seen are all found where some degree of obstruction to the bladder, either in it or below it, is found. And while it is well known that diverticula can be almost congenitally forming in a vulnerable district, the case most commonly encountered is in an elderly male with prostatic or other obstructive lesions.

The diagnosis of diverticulum of the bladder will be made but rarely until such symptoms from it have ensued as make it evident that the supervention of stasis, infection locally and from the local depot to the bladder have already occurred. The treatment by any method except radical excision can be at best palliative of but few of its injurious effects, and fewer of its discomforts.

The principles of the operation, of course, in general are the removal of the diverticulum and the closure of its entrance into the bladder, plus the necessity of draining of both the perivesical space and the bladder itself as well for a period. These requirements could be easily met if the lesion most commonly observed were upon the anterior or lateral walls. Unfortunately this is not the case, and the subjects that present the real problem of operative removal are those with perivesiculitis about the region of the diverticulum and thickening and inflexibility of its walls by chronic inflammation and irritation, and possibly also, with calculus formation. If, added to this combination, there is, besides, a very low-lying exit of the diverticulum near one of the ureteral exits, it may be difficult to avoid opening the abdominal cavity and possibly infecting the peritoneal cavity.

A recent survey of the records of the two major hospitals in the city, where my practice lies, made evident a rather remarkable circumstance, namely, that while a diagnosis of diverticulum of the bladder was not uncommonly made and probably correctly, still there were, in more than a six-year period, not more than three or four cases coming to radical operation. It is certain, therefore, that among our own personnel of surgeons at least, either by reason of a lack of agree-

ment with the teaching of practically all authoritative experts that the radical operative removal is the best treatment, or else due to the belief that the operations are particularly difficult technically or extremely dangerous, the responsibility of undertaking these operations is avoided very consistently.

There have been devised by Lower,<sup>2</sup> Young<sup>4</sup> van Lerche,<sup>5</sup> Judd<sup>6</sup> and others, various ingenious surgical maneuvers and approaches, each one applicable to certain types of the various operative necessities, and each with its need of entire success. The attitude of evasion of operative treatment spoken of is probably based upon the danger of peritonitis in the type of case most commonly seen and technically difficulties, where the diverticulum is old, indurated, situated deeply laterally or posteriorly, and possibly associated with a considerable degree of lower urinary obstruction. Another reason for the uncertainty as to the results of operation lies in the lack of elaboration by most authors, of the technics of approach in the presence of infection. In many textbooks the statements have been repeated that, if possible the operation should be done extraperitoneally, but that this could not be always counted upon. Therefore, it is to this more difficult phase of the operative treatment that major attention will be given.

It is assumed, of course, that before undertaking the operation upon the diverticulum any obstructive influence in its origin or maintenance has been overcome. Whether the operative attack is made first from an intravesical or an extravesical dissection will, of course, depend upon the location of the lesion, its age, lack of elasticity, intensity of infection, etc.; but if the peritoneal barrier to abdominal contamination can be preserved, one major danger of the operation can be overcome.

An entirely possible dissection that would give excellent room and approach to the entire posterior aspect of the bladder was suggested to me some years ago by Dr. J. F. McCarthy of New York and was illustrated by him in several dissections upon the cadaver; and while it was not invariably successful, it did offer a degree of safety that created a hope that with experience and an increase of technical shifts, it might be made nearly perfect. Briefly, the method is to locate, after reaching the bladder, the peritoneal fold and by extreme care dissect it off the whole back and top of the bladder without making any breach in the peritoneal structure. The factors that will make this difficult are: great leanness of the patient and disappearance of the subperitoneal fat, perivesical inflammation, or great loss of elasticity of the bladder wall. However, there is always a cleavage line that can in some manner be utilized. The structure that holds the fundus of the bladder in place is the median umbilical ligament. A dissection that begins without eliminating this ligament is almost certain to fail, but if the beginning of a separation is made upon each side lateral to it, it can be identified and cut and it will greatly aid the ease of progress down the posterior wall.

If there is still an extremely thin and apparently

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homogeneous partition, a very useful expedient is to make, with a fairly large syringe and a fine hypodermic needle, a gross edematization of the whole back of the bladder with saline solution. When this is done, a separation can easily be made with dissection scissors and a breach in the peritoneum avoided. This will so mobilize the bladder that all sides and the back may be approached and the identification of the diverticulum made and dealt with in so direct a way that even where the exit of a diverticulum into the bladder is very close to the ureter or even integral with it, that varying shifts of dealing with a possible retransplantation of a ureter by the making of a plastic operation upon it, may be undertaken with confidence. The suture of the bladder wall is made and after removal of the diverticulum at its entrance, it is very necessary that the area outside of the bladder should be drained for some days, and whether or not the bladder is opened from the top, it is still necessary that decompressive drainage of it also must be done.

I offer my apologies for the presentation of a paper like this that involves only technical details, but have done it because this small shift has been a very great satisfaction to me several times and it is hoped that it may be of at least some small help to those of your members who give me the courtesy of this hearing.

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### Discussion

DR. C. D. CREEVY: The increase in the frequency with which the diagnosis of vesical diverticulum is made, to which Dr. Chapman has referred, is probably due to the widespread use of excretory urography, and to the increased number of patients with obstruction of the vesical neck who are subjected to cystoscopy in connection with transurethral resection.

Since acquired diverticula are much commoner than the congenital variety, the male, with his liability to obstruction at the vesical neck, has twenty times as many diverticula as the female.

The treatment which is indicated in a given case depends both upon local conditions within the diverticulum, upon complications which it may produce, and upon complications associated with, but not dependent upon, the diverticulum.

Since congenital diverticula are commonly single, have muscle in their walls, and are not usually due to obstruction to urination, they may empty themselves and cause no symptoms until they become infected, either by chance or due to a complicating obstruction. They then require surgical removal.

A diverticulum properly situated may compress the ureter, cause hydronephrosis and so require excision even though causing no local symptoms.

Diverticula which are secondary to prostatic obstruction used to require excision if they were of considerable size and failed to empty, because the relief of the prostatic obstruction was usually done through the open bladder, and one worked to avoid any possible necessity for two major procedures. Now, however, when so many obstructions are relieved by closed or transurethral operation, it is perfectly permissible to relieve the obstruction transurethral and later to decide, on the bases of persisting symptoms, whether diverticulectomy is needed.

DR. W. C. CARROLL, Saint Paul, Minn. (by invitation): I just wanted to say I enjoyed all the papers very much and it is a pleasure to be here.

The cases reported by Doctor Kinsella and Doctor Wangensteen deserve special mention and I feel that they should be highly commended on the results obtained.

Bladder diverticula is a subject which has created considerable discussion as to whether it is necessary to remove all of these diverticula. Doctor Creevy made the statement, and I agree, that if the diverticulum is draining, then, perhaps, it is causing no symptoms and the patient can get along for a time without the operation. The exposure of the posterior bladder wall which is obtained by the technic described by Doctor Chapman certainly is much better than trying to operate blindly and I think the results should be very much better.

DR. T. L. CHAPMAN, Duluth, Minn. (by invitation): I am greatly obliged for your courtesy in listening to such a concentrated technical thing as this. I will run a back-trail and answer the question raised as to what the procedure should be. In general, you will find that if you pursue all the literature there is on the subject of what the procedure should be in those cases in which there are already symptoms from the diverticulum, the first attack must be on the condition that started the diverticulum, which is the obstruction. It has been our own experience that where we just had diverticula which we knew about, and had prostatic or median bar obstruction, we had very, very little luck in letting them alone permanently, except with our very elderly gentlemen. We tried prostatectomy and said nothing, but before very long the patient said a lot. They would be the type of men you would be sure would be empty, and they would get up and walk across the office and presently pass a pint of urine. This is sure to happen in those that have a considerable sized diverticulum or in those that have a comparatively narrow neck to the sack. I think all the authorities agree that if you get symptoms from a diverticulum, the mere removal of obstruction will not of itself drain the diverticulum enough to keep it symptom-free.

As to the little trick of mobilization I spoke of, Dr. Creevy was kind enough to say it probably might be applicable to other lesions. It is. McCarthy showed me also how enormously mobile you could make a bladder by that dissection if it could be carried out. This little adjunct in the decline of mobilization is my own. McCarthy said frankly he could mobilize a bladder only in two cases out of five by careful dissection, yet I have done it three or four times in succession without a technical error by using the edemization.

\* \* \*

The meeting adjourned.

HARVEY NELSON, Secretary.

## BOOK REVIEWS

### BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

**PHYSICAL THERAPY IN ARTHRITIS.** Frank Hammond Krusen, M.D., Associate Professor of Physical Medicine, The Mayo Foundation, University of Minnesota; Head of the Section on Physical Therapy, Mayo Clinic. Foreword by Melvin S. Henderson, M.D. 180 pages. Illus. Price, \$2.25, cloth. New York: Paul B. Hoeber, 1937.

**SYNOPSIS OF GENITOURINARY DISEASES.** Austin I. Dodson, M.D., F.A.C.S. Professor of Genitourinary Surgery, Medical College of Virginia; Genitourinary Surgeon to the Hospital Division, Medical College of Virginia, et cetera. Second Edition. 294 pages. Illus. Price, \$3.00, flexible binding. St. Louis: C. V. Mosby Co., 1937.

**CRIPPLED CHILDREN.** Their Treatment and Orthopedic Nursing. Earl D. McBride, B.S., M.D., F.A.C.S. Assistant Professor of Orthopedic Surgery, Univ. of Oklahoma, School of Medicine, et cetera, in collaboration with Winifred R. Sink, A.B., R.N. Educational Director, Grace Hospital School of Nursing, Detroit, Mich., et cetera. Second Edition. 379 pages. Illus. Price, \$3.50, cloth. St. Louis: C. V. Mosby Co., 1937.

**METHODS OF TREATMENT.** Logan Clendening, M.D. Clinical Professor of Medicine, Medical Dept. of the University of Kansas, et cetera. Sixth Edition. 879 pages. Illus. Price, \$10.00, cloth. St. Louis: C. V. Mosby Co., 1937.

**THE MANAGEMENT OF FRACTURES, DISLOCATIONS AND SPRAINS.** John Albert Key, B.S., M.D. Clinical Professor of Orthopedic Surgery, Washington University School of Medicine, et cetera, and H. Earle Conwell, M.D., F.A.C.S. Consulting Orthopedic Surgeon to the Tennessee Coal, Iron and Railroad Co., et cetera. Second Edition. 1246 pages. Illus. Price, \$12.50, cloth. St. Louis: C. V. Mosby Co., 1937.

**EYESTRAIN AND CONVERGENCE.** N. A. Stutterheim, M.D. (Rand). Part-time Ophthalmic Surgeon to the Johannesburg School Clinic, Transvaal Education Department; Late Assistant Eye Clinic, University, Leyden. 89 pages. Illus. Price, 7 shillings, 6 pence, cloth. London: H. K. Lewis & Co. Ltd., 1937.

**TWENTY-FIVE YEARS OF HEALTH PROGRESS.** A Study of the mortality experience among the Industrial policyholders of the Metropolitan Life Insurance Company, 1911 to 1935. Louis I. Dublin, Ph.D., Third Vice President and Statistician, and Alfred J. Lotka, D.Sc., Assistant Statistician. 611 pages. Cloth. New York: Metropolitan Life Insurance Co., 1937.

**MENTAL THERAPY.** Studies in Fifty Cases. Louis S. London, M.D. Formerly Past Assistant Surgeon U. S. Public Health Service; Medical Officer U. S. Veterans Bureau; Assistant Physician Central Islip State Hospital, New York, and Manhattan State Hospital, Wards Island, N. Y. 2 Volumes, 774 pages. Price, \$12.50, cloth. New York: Covici-Friede, 1937.

**THE 1937 YEAR BOOK OF GENERAL MEDICINE.** Edited by George F. Dick, M.D., Lawrason Brown, M.D., George R. Minot, M.D., S.D., F.R.C.P., William B. Castle, M.D., A.M., William D. Stroud, M.D., and George B. Eusterman, M.D. 832 pages. Illus. Price, \$3.00, cloth. Chicago: Year Book Publishers, 1937.

**SYPHILIS.** Morris Fishbein, M.D. 70 pages, Illus. Price \$1.00, David McKay Co., Philadelphia, 1937.

Dr. Fishbein, in his usual excellent and facile manner, describes the various phases of syphilis for the layman.

He gives a brief history of the disease, the significance of various serologic tests, and pictorially shows the menace that syphilis is to mankind. I find this an excellent book for any non-medical person interested in the problem of syphilis, except that the author's estimated cost of treatment seems to me misleading.

F. T. BECKER, M.D.

**IMMUNOLOGY.** Noble Pierce Sherwood, Ph.D., M.D. 608 pages. Illus. St. Louis: Mosby, 1935.

In reading current medical literature, many of us attempt to obtain only the most practical points of the various subjects. We are likely to pay very little attention to the fundamental principles of bio-chemistry and physiology. A thorough review of these principles should be helpful to anyone in the practice of medicine. The subject matter of this book is covered very concisely although it consists of over six hundred pages. Questions concerning suspensions, colloids, hypersensitivity, immunity, et cetera, are answered clearly. Definitions are composed only of essential principles.

The book was written originally for medical students. Because of this, it should be of value to any one of us.

The chapter on colloids is an excellent presentation of the matter. It is located just before the chapter dealing with agglutination, opsonification and complement fixation. This arrangement is necessary because a fair knowledge of colloidal chemistry is necessary to understand the more recent work in immunology.

JOSEPH M. RYAN, M.D.

**A TEXTBOOK OF SURGICAL NURSING.** By Henry S. Brookes, Jr., M.D. Pp. 636; 233 Illus. \$3.50. St. Louis: The C. V. Mosby Company, 1937.

This is a new book, the purpose of which is "to present the various surgical conditions and methods of surgical and nursing care, and to assist in coöordinating the activities of the nurse and the physician (surgeon?) to the best interests of the patient and the mutual satisfaction of the nurse and physician (surgeon?), who are so vitally interested in the welfare of the patient." To do this, an astonishing amount of information has been compressed into a small space. The technical details of equipment, procedures and postoperative care are mostly those in use at Barnes Hospital, St. Louis, where the author is an assistant

## BOOK REVIEWS

surgeon, as well as on the surgical teaching staff at Washington University. The illustrations have been selected with excellent judgment from authentic sources, such as the textbooks of Horsley, Crossen, Hertzler and Chesky and others; many are original.

The plan of the book as set forth above impresses one as being a very good one and well carried out. There is little to criticize and that of an easily remedied nature. Persistently inaccurate is the designation of fracture of the distal end of the radius as "Colle's" in the legend on page 532, in the glossary on page 612 and in the index. It was Abraham Colles, the distinguished Irish surgeon, who first described this fracture with its typical deformity, and therefore it is Colles' fracture or nothing. And we hope to live long enough to see the common diverticula of the pharynx taken from the esophagus in the textbooks and placed where they belong.

G. C.

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**DR. COLWELL'S DAILY LOG FOR PHYSICIANS.** Champaign, Illinois: Colwell Publishing Company. Price, \$6.00.

The physician who does not use a double entry bookkeeping system will find in Dr. Colwell's Daily Log a convenient day book for keeping additional records of deductible items incident to professional expense, taxes, interest paid and contributions which will make easy at the end of each year the filling out of income tax reports. The log is revised from time to time to keep it up to date, and the 1938 volume provides for Social Security records. The volume can be highly recommended.

C. B. D.

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**THE CITADEL.** A. J. Cronin. Boston: Little, Brown & Co., 1937.

The Citadel is a novel of the present day depicting the professional career of an English physician. Fresh from medical school he begins practice, full of medical ideals, as a panel surgeon in a mining community in Wales. His lack of hospital and laboratory facilities does not detract from the thrill derived from his correct diagnoses and the feeling that he is actually of service to the poor community. As he attains his degree from the College of Physicians and obtains a more lucrative practice, financial considerations lead him to forget the high principles of his profession. Splitting fees leads to the loss of a friend at the hands of a poor surgeon and a sudden realization of how far he has departed from his ideals. This has led to

an estrangement with his wife who has seen how far he has strayed from the straight and narrow path. The happiness of reconciliation with his wife and a fresh start is suddenly terminated by his wife's accidental death.

A shot is taken by the author at the smugness of the English medical profession at its refusal to recognize the work of a scientist not in the regular ranks.

The character portrayal throughout is good and the reader follows the professional and spiritual development of Dr. Manson with keen interest. The author obviously knows English practice and does not hesitate to lay bare some of the humbug and faddism which evidently exists in England as well as in our own country. The picture portrayed of the life and practice of the panel doctor is anything but attractive.

C. B. D.

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**PSYCHIATRIC NURSING.** William S. Sadler, M.D., Chief Psychiatrist and Director, The Chicago Institute of Research and Diagnosis; Consulting Psychiatrist to Columbus Hospital, in collaboration with Lena K. Sadler, M.D., and Anna B. Kellogg, R.N. Cloth. Price \$2.75. Pp. 433, with 19 illustrations. St. Louis: The C. V. Mosby Company, 1937.

Since the World War more and more interest and attention are being given to the mentally sick. The State Board of Registered Nurses, realizing the importance of psychiatric nursing, is requiring a certain number of hours in psychiatric training. The medical profession is beginning to appreciate that every person ill with either a medical or a surgical condition has psychologic complications and needs psychiatric ministrations.

The textbooks on psychiatric nursing heretofore have been too abbreviated and failed to emphasize sufficiently the ways and means of handling the various types of neuroses and borderline cases. This book has been written clearly and from a broad and eclectic standpoint. In Part I there is an excellent introduction to psychiatry and a comprehensive view of the approach to mental hygiene. Part II discusses human personality together with the nursing management of the various types of psychoneuroses. Part III amply discusses the nursing of psychoses, a subject which in other texts on psychiatric nursing occupies most of the space. Part IV discusses psychotherapeutic treatment with many illustrations demonstrating physical therapy.

The book cannot be too highly recommended to nurses as well as to general practitioners.

N. J. BERKWITH, M.D.

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